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Herpetological Observations at the Bloomsburg Town Park, Columbia County, Pennsylvania

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Abstract

Observations of herpetofauna at the Bloomsburg Town Park in Columbia County, Pennsylvania, USA, were compiled from casual observations prior to the year of 2019 and formal surveys during the spring and summer of 2019. The presence of at least nine amphibian and reptile species was determined at the park, consisting of one toad (*Anaxyrus americanus*) three frogs (*Lithobates catesbeianus*, *L. clamitans* and *L. sylvaticus*), three turtles (*Chelydra serpentina*, *Chrysemys picta* and *Trachemys scripta elegans*), and two snakes (*Nerodia sipedon* and *Pantherophis alleghaniensis*). Most species were observed occupying habitat in the vicinity of the park's pond. Future survey work may reveal the presence of additional amphibian and/or reptile species at this site.

Introduction

Natural areas or parks can be important havens for amphibian and reptile species, and compiling species lists resulting from surveys can be important for management or tracking long-term trends in species composition (West and Skelly, 1996; Gray, 2006). Additionally, these lists may stimulate and/or may be of value to future herpetological study in these areas (Gray, 2002). They may also benefit those visiting these areas by providing a list of potential herpetofauna they may observe. Presently, no information is available regarding herpetofauna at the Bloomsburg Town Park, a small public recreation area located in Bloomsburg, Columbia County, Pennsylvania, USA. To this end, the purpose of this work is to compile a list of amphibians and reptiles observed within the park during formal surveys from April to August of 2019 as well as from casual observations prior to this survey period.

Study Site

The Bloomsburg Town Park (Figure 1) is located at approximately 40.9924°N, 76.4471°W and consists of roughly 60 acres

of public land. The majority of this space consists of regularly mowed recreational fields, parking areas, playground structures, pavilions, two public swimming pools, and other small buildings. Trees are sporadically distributed within most of the park and mainly consist of oak (*Quercus*), maple (*Acer*), and American sycamore (*Platanus occidentalis*). Notable biological features of the park consist of a section of Kinney Run, a small stream that flows through a portion of the park, and an unnamed, man-made pond approximately 2.5 acres in size. The park contains a small, linear fragment of wooded area along the southern border of the pond. The park is bordered to the south by the North Branch of the Susquehanna River, to the north and east by the town of Bloomsburg, and to the west by athletic fields associated with the Bloomsburg public school system.

Methods

Prior to surveys, a preliminary list of species observed during casual visits to the Bloomsburg Town Park prior to 2019 was compiled based on the author's personal field notes (Table 1). Formal searches for amphibians and reptiles began at the



Figure 1. Aerial image of the Bloomsburg Town Park. Image sourced from Google Earth Imagery (2018).

Table 1. Amphibian and reptile species observed at the Bloomsburg Town Park. Common names follow Crother (2017).

Species	Common name	Observed prior to 2019	Observed during 2019 surveys
<i>Anaxyrus americanus</i>	American Toad	Yes	No
<i>Chelydra serpentina</i>	Snapping Turtle	Yes	Yes
<i>Chrysemys picta</i>	Painted Turtle	Yes	Yes
<i>Lithobates catesbeianus</i>	American Bullfrog	Yes	Yes
<i>Lithobates clamitans</i>	Green Frog	Yes	Yes
<i>Lithobates sylvaticus</i>	Wood Frog	No	Yes
<i>Nerodia sipedon</i>	Common Watersnake	Yes	No
<i>Pantherophis alleghaniensis</i>	Eastern Ratsnake	Yes	No
<i>Trachemys scripta elegans</i>	Red-eared Slider	No	Yes

Bloomsburg Town Park in April of 2019 and concluded in August of 2019. The majority of survey effort was concentrated within an approximately 20-acre plot of the park between Market and Catherine Streets, in the vicinity of the park pond and Kinney Run, where resident amphibian and reptile species are most likely to occur (i.e., most other portions of the park consist of open, mowed recreational fields which are likely occupied only by transient amphibians and reptiles). Surveys almost exclusively consisted of visual encounter surveys as well as listening for the calls of frogs and toads. Additionally, natural and artificial cover objects (i.e., rocks, woody debris, and litter) were overturned opportunistically to search for herpetofauna underneath. All species were identified as per Hulse et al. (2001), and any specimens hand-captured for identification and/or photography were released immediately post-capture. In total, approximately 20 hours of survey effort were conducted during 2019 surveys.

Results

Surveys during 2019, combined with prior observations by the author have documented the occurrence of nine amphibian and reptile species at the Bloomsburg Town Park. Formal surveys during 2019 detected six species; however, only two species (*Lithobates sylvaticus* and *Trachemys scripta elegans*) were found during 2019 surveys that had not been observed at the park prior to 2019 (Table 1). All species observed at the park are as follow in the annotated list below (see also Table 1). Common names follow Crother (2017).

FROGS AND TOADS:

Anaxyrus americanus (American Toad). Individuals of this species (recently metamorphosed juveniles and adults) have been observed in the vicinity of the pond and along the North Branch Susquehanna River prior to 2019.

Lithobates catesbeianus (American Bullfrog). This species was observed within the pond prior to 2019. Several individuals were observed along the shallow eastern and western the shorelines of the pond during 2019 surveys. Calling was heard during July of 2019.

Lithobates clamitans (Green Frog). This species was observed within the pond prior to 2019. Many individuals were observed

along all portions of the pond shoreline in 2019. An individual was also observed within Kinney Run in August of 2019. Calling was heard from June-August of 2019.

Lithobates sylvaticus (Wood Frog). Egg masses of this species (2–3 clumped together) were observed in April of 2019 within a pool that formed in a depression in the small woodland fragment that borders the southeastern portion of the pond.

TURTLES:

Chelydra serpentina (Snapping Turtle). A deceased juvenile (appeared to have been killed by a mower) was observed along Kinney Run during the June of 2017. Several large adults of this species were observed within the pond during 2019 surveys.

Chrysemys picta (Painted Turtle). This species was observed within the pond prior to 2019. Several individuals of this species, including juveniles, were observed within the park pond during 2019 surveys.

Trachemys scripta elegans (Red-eared Slider). At least three different individuals of this species were observed within the pond during 2019 surveys.

SNAKES:

Nerodia sipedon (Common Watersnake). This species was observed along the shoreline of the pond prior to 2019 surveys.

Pantherophis alleghaniensis (Eastern Ratsnake). One individual of this species was found dead on East Fort McClure Boulevard within the park during June of 2017 (previously reported in Hartzell, 2017).

Discussion

This study suggests at least nine species of herpetofauna occur within the boundaries of the Bloomsburg Town Park. The majority of these species occur in the vicinity of the park pond, suggesting this is an important habitat feature for most amphibian and reptile species within the park. All native species documented within the park are considered to be relatively common in Pennsylvania (Hulse et al., 2001) and are among the more common species that occur within Columbia County (Hartzell, 2016a; 2017). Additionally, no species reported within the park are considered species of conservation concern in Pennsylvania

(PGC and PFBC, 2015). However, *Trachemys scripta elegans* are not native to Pennsylvania (Hulse et al., 2001), and may be of concern due to competition with native turtle species (e.g., Pearson et al., 2013, 2015). This species is common in the pet trade and introductions have been previously observed in Columbia County (Hartzell, 2016b). The recent presence of a few individuals (not observed prior to 2019) in the Bloomsburg Town Park pond suggests recent introduction, and most likely by the release of unwanted pets.

Surveys in 2019 did not detect three species (*Anaxyrus americanus*, *Nerodia sipedon*, and *Pantherophis alleghaniensis*) which were observed prior to 2019 (Table 1). More than likely, some or all of these species may still be present within the park but were not detected during the 2019 surveys due to limitation of survey methodology employed (i.e., primarily visual encounter surveys) and the timing of surveys (typically conducted in the afternoon or evening on sunny days). For instance, *A. americanus* are typically nocturnal (Dodd, 2013) and therefore may have been missed during diurnal, visual surveys. However, *P. alleghaniensis* was detected in the town park only by the presence of a single, dead on road individual (Hartzell, 2017) and thus perhaps this species is represented only by the presence of transient individuals rather than any resident population. Several *N. sipedon* were observed in the park prior to 2019 surveys and the absence of this species in the vicinity of the park's pond during 2019 is surprising. This species is sometimes killed by humans due to an unwarranted fear that it may be dangerous, and dead specimens that appeared to have been killed by humans have recently been observed at another nearby park (Hartzell, pers. obs.). Therefore, perhaps individuals of this species have been recently killed by humans or may be absent from the park due to other undetermined factors.

Surveys in 2019 detected two additional species (*Lithobates sylvaticus* and *Trachemys scripta elegans*) that were not observed prior to 2019. While the observation of the latter species may imply recent introduction (see above), the recent detection of *L. sylvaticus* suggests that other native amphibian and/or reptile species may occupy the Bloomsburg Town Park but are presently undetected there. Although habitat types are limited within the park, other species may be found with additional surveys,

perhaps utilizing other methodologies such as the placing of coverboard arrays (Willson and Gibbons, 2009). Coverboard arrays may be particularly useful in confirming the continued presence of snake species in the park (e.g., *N. sipedon*) and may detect additional species as well. *Thamnophis sirtalis* and *Storeria dekayi* are common species within Pennsylvania that can thrive within semi-disturbed environments (Hulse et al., 2001) and are known from nearby locations within Columbia County (Hartzell, 2016a; 2017). Therefore, these snake species may be detected within the park. Additionally, other species, such as *Graptemys geographica* and *Anaxyrus fowleri* have been observed in the vicinity of the North Branch Susquehanna River at locations relatively near the Bloomsburg Town Park (Hartzell, 2016c; 2016d; 2017) and so potentially may be found within the boundaries of the park.

Lizards and salamanders were not detected within the Bloomsburg Town Park, but are known from Columbia County (Hulse et al., 2001; Hartzell, 2016a). One lizard species (*Sceloporus undulatus*) is known from the county (Hartzell, 2016a), but it is unlikely to occur within the park due to the absence of potential habitat. However, at least 13 salamander species are known from Columbia County (Hartzell, 2016a; Johnson et al., 2016; Tavano and Pitt, 2016). While the presence of some salamander species is unlikely at the park due to a lack of potential habitat, certain species may be present in the vicinity of Kinney Run (e.g., *Eurycea bislineata*, *Desmognathus fuscus*) or present within the small fragment of wooded area located on the southern side of the park pond (e.g., *Plethodon cinereus*). While some focus during the 2019 surveys was devoted to searching for salamanders beneath the limited amount of natural cover objects (i.e., rocks, woody debris) within these areas, no salamanders were found. However, further survey, perhaps with the placement of artificial cover objects within these areas may detect the presence of one or more salamander species within the Bloomsburg Town Park.

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Notes on Reproduction of Crawfish Frogs, *Lithobates areolatus* (Anura: Ranidae) from Oklahoma

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Abstract

I conducted a histological examination of gonadal material from 28 *Lithobates areolatus* collected in Oklahoma. The smallest mature male (sperm in lumina of seminiferous tubules) measured 68 mm SVL. The smallest mature female (in spawning condition) measured 76 mm SVL. As previously reported for *L. areolatus*, reproduction occurs in the early part of the year. One April *L. areolatus* adult female had been removed from the breeding population due to massive ovarian follicular atresia in which mature follicles were invaded by phagocytic follicle cells and yolk granules were replaced by vascular tissue.

The crawfish frog, *Lithobates areolatus* (Baird and Girard, 1852) has a disjunct distribution including Indiana and Iowa, extending southward to the Gulf of Mexico (Powell et al., 2016). The most detailed study on the biology of *L. areolatus* is by Bragg (1953) who reported *L. areolatus* reproduction in Oklahoma occurred in February, March and April. *Lithobates areolatus* are reported to be explosive breeders with a peak of chorusing during the first few days of the breeding season (Dorcas and Gibbons, 2008). There are two currently accepted subspecies of *L. areolatus* in Oklahoma: *L. areolatus circulosus* (northeastern Oklahoma) and *L. areolatus areolatus* (southeastern Oklahoma) (Sievert and Sievert, 2011). Therefore, according to Bragg (1953) my samples from Atoka and McCurtain Counties would be *L. areolatus areolatus*; those from Ottawa County would be *L. areolatus circulosus* and those from Muskogee and Hughes Counties are likely intergrades. Subspecies terminology for *L. areolatus* is compatible with Crother (2017). The two subspecies can interbreed (Sievert and Sievert, 2011). In this paper I present data from a histological examination of *L. areolatus* gonadal material from Oklahoma. Utilization of museum collections for obtaining reproductive data avoids removing additional animals from the wild.

A sample consisting of 28 *L. areolatus* from Oklahoma collected 1944 to 2007 consisting of 20 adult males (mean snout–vent length, SVL = 79.8 mm ± 7.2 SD, range = 68–98 mm), seven adult females (mean SVL = 84 mm ± 5.3 SD, range = 76–91 mm), and one sub-adult female (SVL = 73 mm) was examined from the herpetology collection of the Sam Noble Museum, University of Oklahoma, Norman, Oklahoma, USA.

A small incision was made in the lower part of the abdomen and the left testis was removed from males and a piece of the left ovary from females. Gonads were embedded in paraffin, sections were cut at 5 µm and stained with Harris hematoxylin followed by eosin counterstain (Presnell and Schreiber, 1997). Histology slides were deposited at OMNH. An unpaired *t*-test was used to test for differences between male and female SVLs (Instat, vers. 3.0b, Graphpad Software, San Diego, CA).

There was no significant size difference between mean SVL of adult male versus adult females of *L. areolatus* (*t* = 1.42, *df* = 25, *P* = 0.17). The testicular morphology of *L. areolatus* is similar to that of other anurans as described in Ogielska and Bartmańska (2009a). Within the seminiferous tubules, spermiogenesis occurs in cysts which are closed until the late spermatid stage is reached; cysts then open and differentiating sperm reach the lumina of the seminiferous tubules (Ogielska and Bartmańska, 2009a). In *L. areolatus* testes, the heads of the spermatozoans were typically touching the inner boundary of the seminiferous tubule; sperm tails projected into the lumen. In some seminiferous tubules there was a tangled mass of spermatozoa in the lumen. All 20 adult males in my sample exhibited spermiogenesis. By month these were: February (*n* = 5), March (*n* = 6), April (*n* = 8), May (*n* = 1). The smallest mature male *L. areolatus* measured 68 mm SVL (OMNH 26283) and was from March (Muskogee County). In Wright and Wright (1970) adult males of *L. areolatus* ranged from 63 to 104 mm SVL.

The ovaries of *L. areolatus* are similar to those of other anurans in being paired organs lying on the ventral sides of the kidneys; in adults the ovaries are filled with diplotene oocytes in various stages of development (Ogielska and Bartmańska, 2009b). Mature oocytes are filled with yolk droplets; the layer of surrounding follicular cells is thinly stretched. The smallest mature *L. areolatus* female (spawning condition) in my OMNH sample measured 76 mm SVL. Adult females of *L. areolatus* ranged from 75 to 113 mm (Wright and Wright, 1970). A slightly smaller female measured 73 mm in SVL (OMNH 42017), contained non-vitellogenic oocytes and was considered to be a subadult.

Although my sample of seven females is too small to describe the ovarian cycle, the presence of ready to spawn females from February to April (Table 1), reconfirms the findings of others (Table 2) of a winter–spring spawning period for *L. areolatus*.

Four of the seven (57%) of the adult *L. areolatus* in my sample contained atretic oocytes. Atresia is a widespread process occurring in the ovaries of all vertebrates (Uribe Aranzábal,

Table 1. Two stages in the ovarian cycle of 7 adult *Lithobates areolatus* females from Oklahoma.

Month	<i>n</i>	Ready to spawn	Not in spawning condition
February	1	1	0
March	1	1	0
April	3	2	1
May	1	0	1
June	1	0	1

Table 2. Months of breeding by state for *Lithobates areolatus*.

Locality	Breeding Period	Source
Alabama	February-March	Mount, 1975
Arkansas	Begins in January	Bacon and Anderson, 1976
Arkansas	February to April	Trauth et al., 1990
Illinois	March to April	Phillips et al., 1999
Indiana	March to April	Minton, 2001
Iowa	mid-April	LeClere, 2013
Kansas	March to May	Busby and Brecheisen, 1997
Louisiana	Winter	Boundy and Carr, 2017
Missouri	late February to April	Johnson, 2000
Oklahoma	February to April	Bragg, 1953
Tennessee	February to early May	Niemiller and Reynolds, 2011
Texas	February to June or year-round	Tipton et al., 2012
Not given	February to June	Wright and Wright, 1970

2009). It is common in the amphibian ovary (Saidapur, 1978) and is the spontaneous digestion of a diplotene oocyte by its own hypertrophied and phagocytic follicle cells which invade the follicle and eventually degenerate after accumulating dark pigment (Ogielska and Bartmańska, 2009b). See Saidapur and Nadkarni (1973) and Ogielska et al. (2010) for a detailed description of the stages of follicular atresia in the frog ovary. Follicular atresia is a conspicuous feature of postbreeding ovaries (Saidapur, 1978). Atresia may influence the number of ovulated oocytes (Uribe Aranzábal, 2011) and can remove females from the breeding population (Goldberg, 2017). Two of the mature females, one from April (OMNH 43585, SVL = 88 mm) and one from June (OMNH 42015, SVL = 91 mm) exhibited massive follicular atresia. Mature oocytes in the April female (OMNH 43585) were no longer viable; yolk granules were absent, the interior of the follicle was filled with blood and the inner periphery of the follicle was lined by a layer of enlarged, vacuolated follicle cells. The ovary from June (OMNH 42015) contained numerous small atretic oocytes interspersed with non-vitellogenic oocytes. It is conceivable this *L. areolatus* female may have spawned earlier in the year. However the

factors responsible for the massive atresia resulting in destruction of the ovarian follicles in the April female (OMNH 43585), during a time when *L. areolatus* breeds in Oklahoma (Bragg, 1953), are not known.

The causes of follicular atresia in non-mammalian vertebrates are not fully understood although it is associated with captivity, lack of food, crowding and irradiation (Saidapur, 1978). In fish, atresia of follicles may be induced by starvation (Hunter and Macewicz, 1985). Adverse environmental conditions such as starvation and suboptimal lighting may also cause atresia of vitellogenic oocytes in amphibians (Jørgensen, 1992).

Months of and time of reproduction (by state) for *L. areolatus* are shown in Table 2. Breeding is restricted to early in the year throughout its range. The report of year-round reproduction for *L. areolatus* in Texas (Tipton et al., 2012) merits reexamination.

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Appendix

Twenty-eight *Lithobates areolatus* from Oklahoma examined (by county) from the herpetology collection of the Sam Noble Museum (OMNH), The University of Oklahoma, Norman, Oklahoma, USA.

Atoka: OMNH 39111, 39112, 39470, 39471, 39826, 42015–42017, 42021; **Bryan:** OMNH 43585; **Delaware:** OMNH 26313, 48041, 48042; **Hughes:** OMNH 38156; **McCurtain:** OMNH 26270, 43863, 43864, 43866–43868, 43871, 43873; **Muskogee:** OMNH 26283; **Ottawa:** OMNH 27605, 27606; **Seminole:** OMNH 43713; **Tulsa:** OMNH 30916; **Washington:** OMNH 39878.

Meeting My New Neighbors

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Until very, very recently, I lived in the Upper Midwest—the *urban* Upper Midwest—all my life. And while Minneapolis (grade school), Milwaukee (high school), and Chicago (college and beyond) all have many fine attributes, none of these cities was especially congenial and conducive toward nurturing my interest in reptiles and amphibians. Yes, there were and are zoos and museums and libraries, and I have availed myself of these resources. Yes, there is the camaraderie of the Chicago Herpetological Society, a truly outstanding organization. And yes, there were always pet stores.

But for someone like myself desiring contact with wild herps, the climate and urban environment presented challenges. In Minneapolis, I had “Grass Lake,” really a large retention pond, where, two months out of the year, I could wade into chest-deep water that I shared with blood-sucking leeches and catch a painted turtle or two. In Milwaukee, I stumbled upon a similar but smaller pond between three intersecting train lines and discovered a remnant population of Butler’s garter snakes. And in Chicago and the collar counties, especially DuPage County, I found a diverse assortment of amphibians and reptiles, and even surveyed those in DuPage County for the forest preserve district for many years.

All these urban experiences required more-than-casual efforts on my part. How different it was (and is) with birds! I occasionally represent the DuPage Birding Club before local clubs and groups, and my most-requested program deals with attracting birds to home gardens and focuses on the one hundred or so species I have seen in or from my small suburban yard, including bald eagles, ospreys, sandhill cranes, and great horned owls. In fact, even as I draft these lines, I am watching a Cooper’s hawk hunt for songbirds in my yard. But herps? Over a period approaching almost four decades, I have seen one American toad and one juvenile northern water snake on my property. Since I am nowhere close to suitable habitat for either species, I am at a loss to explain how they landed on my property, especially the snake: It represents a species that I found in only a few DuPage locations, all many miles from my house; it somehow appeared in the driveway of the one person in the village who recognized what it was, was not afraid of it, and in fact really appreciated it!

All this changed a little over a year ago. My wife and I had been vacationing in Naples, Florida, on Florida’s Gulf Coast, for several years. Although the cold and snow of the Upper Midwest never particularly bothered me—hey, I grew up knowing nothing else!—I agreed with my wife that shoveling the drive, bundling up, etc., for months at a time had lost their romance. During one of our vacations, a chance meeting with two former colleagues led to our discovering a gated community built around a 40-acre freshwater lake on the northeast side of Naples, where, in the words of one colleague, “the normal people live.” Within three or four days of visiting the community, we made an offer on a modest ground floor condo 15 feet from the lake. It

didn’t take long to discover that I had new neighbors!

There were several things about the condo that appealed to us. It was affordable, it had enough space for us, it had a magnificent view of the lake, and it was well maintained. My wife pointed out (after I had hit my head on it several times) that the chandelier in the dining room was *exactly* the same as our one up North. I knew my SUV had belonged to a family living in our suburb, but that it had also been serviced at a dealership in Naples. All these were signs, omens, but none so much as when I looked out the living room window and saw a large southern black racer basking on the hedge!

“Oh, the black ones are one of the good snakes,” the real estate agent informed me. She spoke familiarly of the racers she had seen on her daily walks around the lake, and I later learned that the racers are at least tolerated by my human neighbors, who consider it a “good snake” because it is not venomous. So now I divide my time at irregular intervals between Glen Ellyn and Naples. In Naples, I quickly discovered that I share the community with a variety of reptilian neighbors whose acquaintance requires no special effort on my part. I don’t have to trudge through a field or slosh through mud or flip ground cover in order to see them. Some encounters are opportunistic, but most require no more effort than does buying a cup of coffee from the same barista day after day. My most frequently encountered reptile neighbors are lizards, and just as the most frequently seen urban birds are nonnative (rock pigeons, starlings, and house sparrows), the most frequently seen lizards also hail from outside of Florida. Topping the list is the Cuban brown anole. I think a visitor to the Florida peninsula would need to make a concerted effort *not* to see one of these lizards! Given a patch of vegetation, and the brown anole is sure to appear. What I enjoy about these lizards is that they behave, and I can watch it! One of my favorite activities (I am taking liberties with the word *activity*) is to sit on my lanai, adult beverage in hand, and watch these lizards just being lizards. The males will climb three or four feet up the side of a palm and display their orange dewlaps, bobbing their heads, and scanning for an encroaching male or an available female. Meanwhile, a smaller female will leap out of a bush, cock her head, and then grab a small insect. The real fun begins when another male enters the first one’s territory. After competitive head-bobbing and dewlap displaying, if the



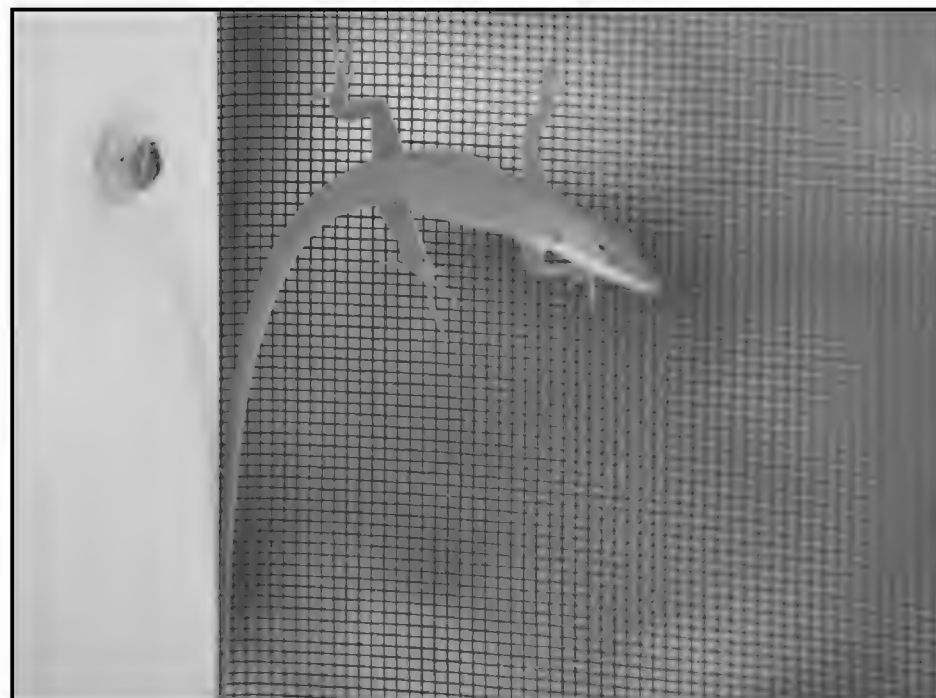
Brown anole (all photographs by the author).

interloper isn't deterred by the resident male, a brief squabble ensues, usually just a few seconds, and then one or the other, usually the interloper, scurries off. The victor climbs back to the palm and repeats his display.

I usually don't expend any effort to see Brown Anoles. Depending on the temperature and time of day, I'll start seeing them as early in the morning as sunrise, and as late in the day as sunset. On cloudy days, they may not make an appearance until late morning, but sooner or later, I'll start seeing them. In my experience, the brown anole is the most commonly seen reptile in the region, a resident of every park, garden, and green space. It wasn't always so. The species was documented in the Florida Keys in the 1880s and had reached the mainland sometime in the 1940s. Most sources state it was introduced (some even claiming pet owners released their animals), but since it is native to Cuba and the Bahamas, it is just as likely that a few hitched a ride on a ship or two. I know Northerners who have caught one on a plant they bought at a garden center and have called me, as well as one lady who moved from Florida to Chicago in January (let that sink in) and found some inside her rental trailer. Because nonnative, invasive plants and animals present a real challenge for Florida conservationists, there are a number of laws requiring licenses, permits, etc., to keep these animals; there doesn't seem to be laws restricting collecting them. The problem is, once an animal is collected, it is against the law to release it! It is no matter to me: from my lanai I can watch the anoles' antics without maintaining a cage!

The brown anole is notorious for displacing the native green anole, even eating its eggs and hatchlings. During all my prior visits to Florida, I had never seen a green anole. Then one day a month or two after buying the condo, as I was laying stones for a walkway, I felt something on my leg. I looked down: staring up at me was a green anole! I didn't move. The lizard didn't move. We stared at each other. My leg started to cramp. I twinged, and the anole bolted off my leg onto a palm and disappeared in the foliage. Since then I have seen green anoles four or five more times, always on the same tree. Although they can change color, their brown is an even brown, unlike the brown anole's mottled brown; the best distinguishing feature, though, is the green anole's more pointed snout. Most sources will tell you that the brown anole has replaced the green anole or that green anole has become more arboreal since the browns have invaded. I've talked to a couple of people, though, who seem to know what they're talking about, who told me that the greens seem to have started adjusting to the presence of the browns and are gradually descending from the trees.

The novelty and good fortune of having so many reptile neighbors is not lost on me. The green anole has even gone out of its way to welcome me into the neighborhood. Late one morning, after my wife and I had been shelling along the Gulf, I came home to discover a green anole on the screen in our lanai! It climbed slightly higher as I approached, but compared to the manic scrambling of brown anoles that I have approached, seemed unconcerned about its situation. I was able to photograph it once or twice before catching it and releasing it into the (by now) infamous palm tree outside the lanai. It even posed long enough for me to take a few photos, at least one of which



Green anole.

was almost in focus.

One warm afternoon, having enjoyed a few adult beverages, I dozed off. My snoring woke me, and I opened my eyes to see a large green lizard with glaring eyes and vertical pupils staring at me from the other side of the lanai's screen. It just froze there, but I was definitely the focus of its attention. It crawled forward a step or two, froze, eyed me, and then moved on. It looked exactly, in my mind, like the velociraptors from *Jurassic Park*. I had no idea what I was seeing; I only knew what it wasn't. Later, when my wife and I were in a bookstore, I found a field guide and quickly identified my mini raptor: knight anole, yet another Cuban species whose presence in Florida is blamed on pet owners releasing pets. From what I've learned, it is a dubious choice for a pet: They are large for an anole and capable of giving a painful bite. A docent at a Naples nature preserve told me they are uncommon in the region and are usually found more toward the center of urban areas than where my condo is. I have only seen the one, but since I was unable to photograph it, I am on the lookout for another.

The first time I saw a brown basilisk outside my condo, I stared in disbelief. First, it was big, perhaps two feet long. Then it rose on its hind legs and ran into the bushes! "Ran" hardly conveys the speed. Lizards are fast, but this one . . . ?! The basilisk is another nonnative; its native range is southern Mexico through Central America and into northern Colombia. It is often called the "Jesus Christ" lizard because it can run on water! Since my first sighting, I have seen many basilisks bask-



Brown basilisk.

ing on the sidewalks and roads of my community, as well as around the parking garage at Vanderbilt Beach, a few miles from our condo. All of them bolted if I approached within a few yards of them. And while I have seen basilisks in close proximity to each other, except for occasional head bobbing, I have seen no interactions.

If you've stuck with my narrative this far, you probably have concluded that the lanai, screened in and facing the lake, is one of my most frequented and enjoyed locations along the Gulf Coast, to say nothing of the condo. So it was that one morning as I was sipping my coffee (no adult beverage this time), I spied a male basilisk (its head crest distinguishes it from the female) hanging on the screen. Since my past experiences with basilisks had convinced me they flee at the slightest movement on my part, I debated whether I should attempt to get my camera. I risked it. The lizard didn't move. I started approaching it, finally getting to within two feet, and still it didn't do more than cock its head. I took a few more shots, then sat back down in my chair to watch it. I thought it might leap into the hedge; instead, it just inched its way across the screen until it reached the end of the lanai; then it leaped into the orange and yellow croton growing outside the lanai's door.

Earlier I mentioned that I like lizards because they behave. Now I know all animals behave, but lizards interact actively with their environment and with each other in a way many other reptiles do not. So when the sun sets, I have another lizard outside my condo that affords me opportunities for observation: the Mediterranean house gecko. I've seen one in the morning outside my condo, and I discovered one inside my storage locker, but normally I see the geckos on warm, very humid nights hunting insects attracted to the lights outside our condos' doors. The geckos behave as though their pinkish skin makes them invisible against the stucco walls of the buildings, and so I can approach them more closely than I can diurnal lizards, but still, if I approach too closely, they dart away as fast as any



Mediterranean gecko.

anole. One night I grasped at one and was shocked to realize *I had caught it!* Now what? I put it down on the ground. It just lay there. Had I killed it? Now my conscience was nagging me. I poked it. I rolled it over. Nothing. I went inside the condo to get my camera; when I returned, the gecko was gone. I read later that like the hognose snake, these geckos can play dead.

I've discovered that one of the best areas to see house geckos in numbers is on the walls of the community's clubhouse. These seem a little more flighty than the ones outside my door, so I am "forced" to watch them from the pool. They go about their business of catching insects, just as the ones outside my condo do, but I've counted over twenty on a single night. The smaller ones seem able to wander with impunity, but if two adults approach each other, one is sure to back away. I've also seen them in similar situations on drugstores, convenience stores—just about anyplace with outside lighting.

My shyest lizard neighbors are probably the southeastern five-lined skinks. At least I think they are this species: They present themselves so suddenly and briefly that I am relying on range maps to confirm that's what I've seen. I'm usually returning to my condo when one reveals its presence by dashing noisily through the dead vegetation, and I get a glimpse of its shiny, striped body. I find it interesting that none of my human neighbors seems familiar with this lizard; then again, many of the humans don't distinguish between anoles and geckos. My encounters with snakes around the condo have been as brief, sudden, and unexpected as my encounters with skinks. My human neighbors are familiar with the black racers, usually spotting them basking in the early morning, then slipping back into the vegetation. Late one morning, as my wife and I were returning from a shopping expedition, a racer in the entryway startled me outside our door. My appearance alarmed the snake, which thrashed against the walls, even trying to scale one before zipping into the plantings.

The only snake that I have had a "hands-on" encounter with was a small southern ring-necked snake. I had seen the crushed body of one in the parking lot of our building a few months after we bought the condo; I had also seen a DOR of a larger one on the road circling the lake. I caught the live ringneck one evening after I went outside to photograph the sunset. I decided to walk around the building, and just as I approached our entryway, I spotted a very small snake wriggling across the sidewalk. Wanting to photograph the snake, I caught it and placed in a small plastic cage I had brought down from the North "just in case"—and this was a case.

My prior experience with ringnecks was limited. Once when



Southern ring-necked snake.

I was visiting a brother who lived in West Virginia, his neighbor came over to say that he had lowered his garage door on the tail of a very large snake and would I catch it. I walked over to his house with him and saw about two inches of snake thrashing about. I grabbed what I could, and the neighbor raised the door. What he had pinned was a juvenile ringneck, which fortunately appeared unharmed. Of course, the neighbor began to interrogate me: Was the snake “poisonous”? How did I know the snake couldn’t kill me? What was I going to do with it? (I released it in the woods behind my brother’s house).

My Naples ringneck was also small, possibly a juvenile. It immediately buried itself in the coconut coir at the bottom of the cage, remaining buried during the day and emerging only at night. I quickly discovered that if I uncovered it and then returned it to the cage, it would flip over and reveal its orange-yellow belly, holding this pose for several minutes, even if I walked away. After two nights, I released it among the plants in front of the condo. There it could hunt for the invertebrates, small lizards, and reptile eggs that form a Ringneck’s diet. Because of the large lake that forms the center of the community, as well as the drainage canal outside the community’s gate and the numerous ponds in the surrounding communities, I have expected to see water snakes. I have not—and not for any lack of trying! Since the lake is so close to my condo, I often go out to cast for bass, and despite many hours spent throughout the day at various times of the year, I have not seen one snake on the lake. I was told that someone in the community had had a Water Moccasin in her driveway, which is entirely possible. Moccasins are one of the four species of venomous snakes reported from Collier County: diamondback rattlesnake, pygmy rattlesnake, and coral snake are the other three. Based on reports from towns further east in the county (and therefore closer to the Everglades), I know diamondbacks do occur in developed neighborhoods, but none of my human neighbors have shared any anecdotes of encounters in our community; besides, the community is overrun with small, dark rabbits (I’ve counted over thirty feeding in the open during the middle of the day just along the road leading out to the main entrance), so a few Diamondbacks could be a welcomed asset (at least to me). So far, the Burmese python has not been reported from the Gulf side of Collier County, although it has been from the eastern sections of the county. The species receives quite a bit of media attention, deservedly so, although I doubt it has the proclivity for human flesh that some accounts emphasize. And so far American Alligators have not been reported in our lake: The community employs “lake doctors” who visit the lake every week or so to test the water chemistry, monitor fish populations, and, if found, remove alligators! Some friends in the community have reported seeing a small ‘gator in the canal outside the community, but it didn’t stick around.

What I have seen in the lake are turtles. Shortly after we moved in, I noticed something proboscis-like breaking the surface of the water, but I couldn’t tell what it was. Then one morning when I had binoculars in hand and was watching the egrets, ibises, and herons that hunt around the edge of the lake, the unknown proboscis again broke the surface. Through the binoculars, I could detect a snout, eyes and a very large shell: I was looking at a Florida softshell turtle, and a large one at



Peninsula cooter.

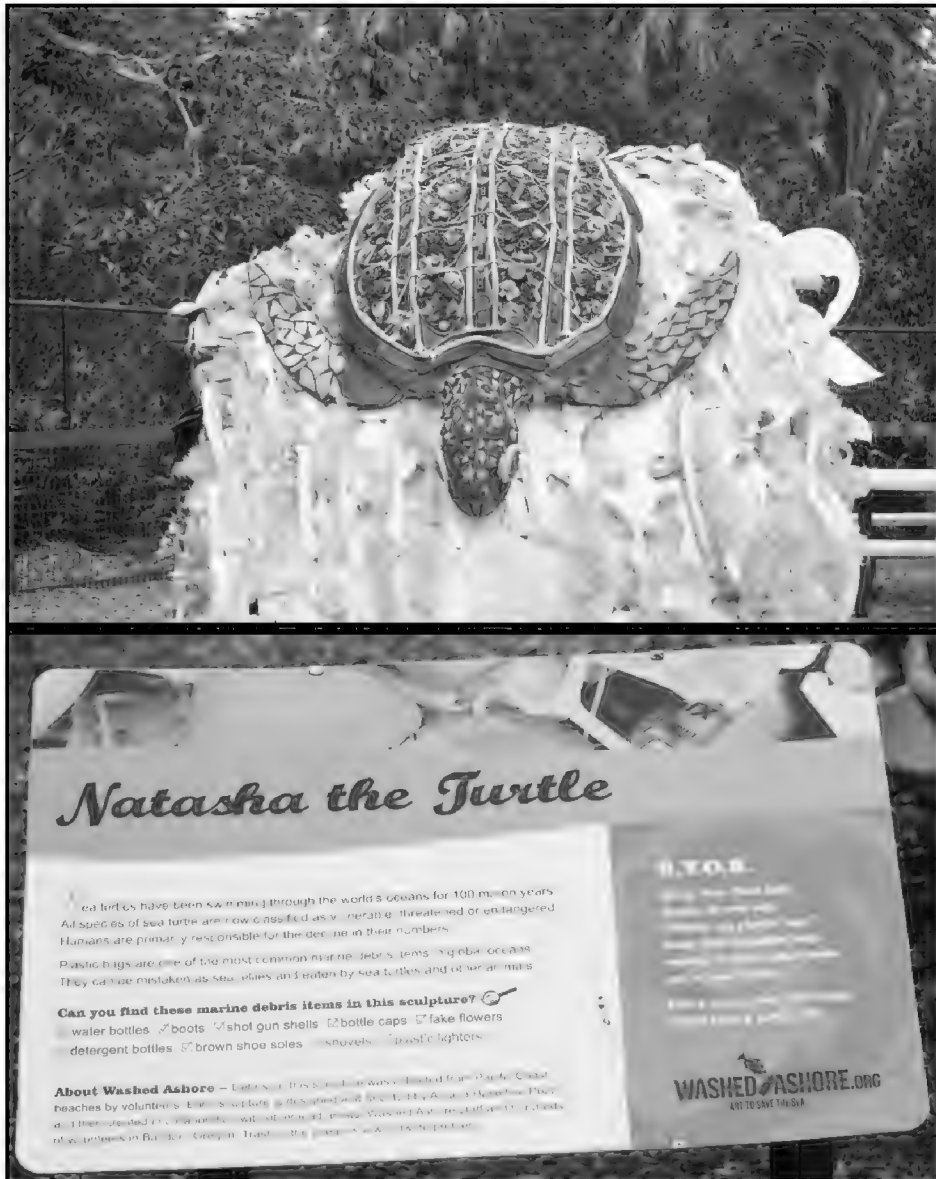
that—I estimate the shell to have been all of two feet! Since then I have seen these turtles almost every day. They patrol the shoreline, staying 15 or 20 feet from the shore. Sometimes they just float at the surface, basking in the sun before resuming their patrols.

Softshells share the lake with Peninsula cooters, a type of slider. These turtles, too, patrol the edge of the lake and float on the surface in order to bask. I actually had a hands-on encounter with a female, taking her off the road and returning her to the lake. She may have been moving from the canal to the lake, or she may have been returning to the lake after laying her eggs. She was close to the only area of the lake not rimmed by chunks of limestone, a sandy stretch where residents could put in their canoes and kayaks. This turtle was good-sized, with a foot-long carapace. The only other turtle I have seen at the lake was a small mud or musk turtle that swam by me one day as I stood fishing. Unlike the softshells and the cooters, this turtle was only a few feet from the shore, but its rotund shell was distinctive enough for me to take a stab at identifying it.

My favorite chelonian neighbor requires a visit to the Naples Preserve, a 9.5-acre enclosed preserve just a mile or two from downtown Naples. The preserve is home to a population of more than one hundred gopher tortoises. My wife and I have walked the boardwalk through the preserve at all times of the day throughout the year, enjoying the shade of native pines and the blooms of indigenous bromeliads, and sighting one or more tortoises has always rewarded us. It doesn’t take much effort or



Gopher tortoise.



a trained eye to spot the sandy holes marking the entrances to their long, deep tunnels. Because over three hundred species of animals use these tunnels, often sharing them with the tortoises, the tortoise is considered a “keystone species,” one whose presence is required for a stable and healthy natural community. Unfortunately, land developers also prefer the dry, sandy upland areas where these tortoises live; in Florida developers strip sites of all natural vegetation, drain existing ponds and lakes (and then create manmade lakes) and otherwise render the landscape as something out of the movie (as my wife pointed out) *Fern Gully*. As a result, the developers threaten not only tortoises but also species utilizing their burrows (indigo snakes, diamond-backed rattlesnakes, burrowing owls, and so on).

At the preserve, I have seen tortoises display all sorts of behaviors besides basking. Most frequently I see them wandering their territories, foraging for food among the dried grasses and prickly pear cactuses. They seem to nibble at everything when they feed: a bite here, a nip or two there, and then they move on. Once I was able to witness two males battle, and several times I have heard what I believe to be the distant ramming of shells. One of the docents at the preserve who closely monitors the tortoises told me she has recently seen females battling, something she attributes to too many tortoises in too small an area. Unfortunately, suitable habitat is limited outside the preserve, and where it does exist, tortoises are present. A gopher tortoise along the Gulf at Vanderbilt Beach *approached* me one morning, showing a great deal of interest in my toes! I have seen at various times two or three tortoises along Goodlette-Frank Road, a very busy thoroughfare a short distance from my neighborhood. And tortoises are known to make an appearance in yards and garden in the area.

Turtles and tortoises enjoy a degree of appreciation and

protection from my human neighbors that I have rarely seen extended to other reptile species. Throughout Naples are statues of sea turtles. One that has made the biggest impression on me is outside the Naples Zoo. It is named “Natasha” (which is also the name of my Russian tortoise) and the statue is composed entirely of plastic that swept up along the Gulf beaches. The placard beneath the statue alerts people to the dangers plastics pose to all sea creatures, including turtles, which mistake plastic bags for jellyfish, an important food for most sea turtles (I recently read that the Charleston, South Carolina, aquarium has found plastic in the digestive systems of 95% of the turtles that are rescued and brought in). All along the beaches, even the busiest, volunteer monitors stake off sites where seas turtles have laid their eggs. Tortoises, too, receive attention, and many trails have signs informing hikers about gopher tortoise conservation.

Another species that makes an appearance outside my condo is the cane, or marine, toad. My human neighbors express a loathing for the toad that substitutes for the loathing usually reserved for snakes! Signs warning of the danger these toads present to pets are posted throughout my community, and articles cautioning people about the toads (which often get reported as “Bufo Toads”) appear regularly in local papers. Sugar cane growers introduced these toads in the 1930s and 1940s to control insects; the toads seem to have done very well for themselves, thank you. (At least pet owners get to share the blame on this one.)

My wife and I saw our first cane toads one evening when we decided to cool off in the community’s pool. We had the pool to ourselves, and were just holding on to the edge and talking, when a toad about the size of two softballs leaped out of some vegetation and began hunting insects under a light. A minute later and an equally large toad jumped out of the bushes on the other side of the light. Because of their size, I immediately knew what they were. I left the pool to get a closer look, at which point the toads sprang back into the bushes, displaying an agility the toads I’ve seen in Chicago don’t possess. It was a truly toady night, because as we walked back to our condo, we encountered three more toads, and saw several others under lights.

Having seen them, I was determined to photograph them, but they proved elusive. So, ignoring state law, I decided to catch one and photograph it. My wife realized what was on my mind when I bought a plastic shoebox to hold my quarry, and so she



Cane toad.

insisted that I (a) not bring the toad into the condo and (b) wear vinyl gloves when I handled it. That night, shoebox in vinyl-gloved hands, I stalked the cane toad.

Soon enough I saw one under the lights by the pool. I approached *sooo* close, but the toad saw me and bounded away. I sat down on a recliner and waited. A few minutes later another toad emerged from another bush. I approached *sooo* close . . . same result. I moved to a different recliner (and I suppose I should have wondered why I was the only person at the pool on this hot, humid night). Finally I spotted a toad, not quite as large as the first two but big enough. It leaped when it detected me, but I cut it off; it leaped in another direction, and I cut it off again. Finally I was able to grab it and put it in the shoebox. This was a smallish toad, maybe six inches snout to vent, but it was a marine toad.

When I returned to the condo, I put the shoebox inside our storage locker, placing a gallon jug of something on top of the box. I removed the gloves and then walked across the parking lot to dispose of them: I did not want the love of my life to accuse me of contaminating the condo with toad detritus! The next morning I attempted to photograph my catch. It proved a reluctant model, but I managed to take a few shots that at least were recognizable. That evening I took the toad back to the pool area and released it (this is when I broke the law). Guess what? The following morning there was a cane toad just outside my condo door, a larger one than the one I caught and just as wary and agile as the ones I had first seen at the pool!

I don't know if the precautions I took prevented any accidents when I handled the toad, but I do know that many years ago I was not so careful after handling a Cuban treefrog, another neighbor around the condo. This occurred during a visit to Sanibel Island, which is located about an hour north of Naples. For reasons I no longer remember, I handled a frog I found on the side of a palm tree; then I went inside to read. At some point I scratched my right eye: within minutes it began to burn and swell shut! I realized—too late—that I must have had some of the frog's protective mucus on my fingers. I hadn't feel any after I touched the frog, but nevertheless the mucus was there. I immediately washed my hands and rinsed my eye. My eye continued to swell shut, so I went to bed, the burning somewhat abated. The next morning the eye was partially swollen and very red, but by the end of the day it appeared normal.

Since then I have been very cautious around Cuban treefrogs. On its web site, the University of Florida's Department of Wildlife Ecology and Conservation has quite an informative page about the species, stressing how invasive it is and what a risk it poses to many native species of frogs, which it eats, as well as lizards, small snakes, and nestling birds; the site notes the frogs appeared in the 1920s, probably coming in as stowaways on cargo ships. Cuban treefrogs are active year-round within their range, but my sightings (including frogs on the screen of the lanai at night) have been most common in late summer during and after rain. The university's page reports that the frogs breed year-round and will lay eggs in a body of water as small as a birdbath. That said, I have yet to hear the raucous, grating call of one of these frogs. They seem to vary in how cautious they are when approached. Some will allow me to approach to within a

few inches, but others climb up the side of my building almost as soon as I open a door.

During the day, Cuban treefrogs conceal themselves, and I discovered that they take advantage of all sorts of man-made cover. One of the tasks I have to perform every year is installing hurricane shutters at the start of hurricane season (because of my schedule, this usually occurs during late June or early July) and then removing them once the season passes. My shutters consist of overlapping corrugated sheets of aluminum that fit in troughs at the top and bottom of each window. My wife and I really dislike these shutters because they block the light coming into the condo; in my wife's words, it's like living in a cave, so when the time comes, I expedite their removal as quickly as possible. The order in which I remove shutters leaves the four windows on the north side of the condo the last to come down. These windows receive no direct sunlight, and that and the fact that the north side of the building remains slightly damper than the other exposures creates a microhabitat the frogs apparently enjoy. At least that seemed to be the case last fall, because as I took down one panel of shutter, I exposed one or more Cuban treefrogs! One window even had four frogs behind the shutter!

Most of the frogs that afternoon blinked at me two or three times, then crawled up the side of the building before jumping into nearby trees. One frog, however, just squatted in place. I had on work gloves, so I grabbed the frog and placed it on a bush (again: because I released a nonnative species, I broke the law). The interaction took less time than it takes to tell. Then I looked at the glove: it was covered with sticky Cuban treefrog mucus!

I confess that the prevalence of nonnative, invasive species around my condo disturbs the environmentalist and conservationist in me. I have learned that so much that appears natural and tropical along Florida's coasts is really nonnative and invasive. Florida may be ground-zero for invasive species in the United States. Hundreds of plants have escaped cultivation and now threaten the environment. When possible, conservationists remove species such as the Australian pine and Brazilian pepper, even though many homeowners continue to landscape their properties with them. Nonnative plants (and this is as true in Chicago as in Naples) do little to improve the natural environment. Few if any insect species feed on them; without the caterpillars and grubs, there is little for birds to eat; the area loses biological diversity; and the loss of diversity diminishes and degrades the habitat.

At the same time, I enjoy the brown anoles, the basilisks, the Cuban treefrogs as much as I enjoyed the rock pigeons, starlings, and house sparrows when I was a little boy in Minneapolis. For the first time in my life, I can observe the behavior of reptiles and amphibians just by looking out my window (okay: my lanai screen). I don't have to put any special effort into it. Will I make any contributions to herpetological knowledge? I doubt it. I am sure someone has studied population density and dynamics of the brown anole, someone has recorded the prey of black racers in semi-urban environments, and someone has certainly studied the dynamics and impact of Cuban treefrogs on native anurans. Now, though, it is my turn to observe, appreciate, and enjoy my new neighbors.

Full Camo, a Hunter's Moon, Marauding Badgers, and Blake the Snake

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This author is often ridiculed when he chooses to enter the field dressed in full camouflage attire. The idiots who ridicule him are often dressed in blue jeans and brightly colored shirts. First off, fashion statements are not my strong suit. I like being *not* noticed. This is especially true when I parade about on hillsides in front of tent cities of hunters, who occasionally occupy the same areas that I frequent. Anybody who knows hunters recognizes that they often kill snakes — espe-

cially rattlesnakes—on sight. Some do the right thing, and eat their kills. Others do not. Whether they eat their kills or not, I personally don't wish to be the person who draws their attention to *any* snake. Bright blue pants and gaudily-colored shirts are fine for people-related events. They are not fine for trying to sneak about on hillsides in full view of very alert and highly curious folk like hunters—especially if one is visiting aggregate dens of snakes. These days, *especially* during hunting season, I always ask people to dress in clothing that blends in with the surroundings. Gray, tan, light brown is good, but why mess around? Camo is better! Yes, I mainly wear camo to hide from people.

How “human-proof” do I think camo is? I'm glad the reader asked that question! I will tell you the story about what sold me on wearing the stuff. Even though the date this happened is probably written down, I'm not going to thumb through over 3,000 pages of untidy scrawl just to find it. Even the most discerning reader would forget the date as soon as it was relayed anyhow. No, we're going to call this day something more memorable. I call it “the Day of the Butt.” On this, the day of my full camo epiphany, I was hot on the trail of a telemetered rattlesnake, antenna held waist high, merrily blazing across a contour on Iron Mine Hill. Suddenly, at a distance of about five meters, I saw a butt directly in my path. That's right—I didn't stutter. I saw a butt, and nothing but the butt. It was a naked butt—a Caucasian butt, lily-white in color. Said naked butt was hovering about 90 centimeters above the ground. It was viewed levitating deep in the shade of a palo verde tree. And then as suddenly as the butt appeared, it disappeared! Poof! Just like that,



Figure 1. “Badgers? We don’t need no stinking Badgers!” This image, taken 30 August 2009 while radio-tracking on the Suizo Mountain study plot, developed as a direct result of the author being dressed in full camouflage while in the shade of a convenient Palo Verde tree. This American badger (*Taxidea taxus*) was first observed ambling toward the far side of the prickly pear cactus seen in both the left and right images depicted here. The author stepped out of the shade to draw closer, and got off these two images just prior to being noticed by the subject. The time of digging is estimated to be less than 30 seconds. The depth of the hole that the badger dug during that brief time between the photographs is clearly shown in the right-hand image. He had already dug down more than half of his body length. That is where the “one body length per minute progress,” stated in the early going of this article, came from. (These and all other images by the author.)

the butt was gone! And then the person to whom the butt was affixed stepped out of the shade and into the light of day. He was dressed in full camo, from head to toe. The reason his butt had disappeared from view was because he had pulled his pants up! I surmised that this person was a hunter, first because of the rifle he carried, and second, because of his full camo wardrobe. He had his rifle resting on his shoulder, the way a marching soldier might carry his or her rifle on parade. The bolt on his rifle was in the downward position, and the open breech was empty. This man was a courteous hunter. The displayed open chamber and shouldered weapon indicated that he wasn't going to shoot me (at least not immediately). As our eyes locked, he spoke first:

“Jeez Louise! It's getting so that a guy can't take a shit in peace out here anymore.”

I laughed out loud at this announcement, but began to blubber profuse apologies. Said apologies probably did not sound sincere, as they were interrupted by fits of embarrassed giggles. But everything relaxed when the hunter joined me with a few belly laughs of his own. We laughed together for a short time. After that, I once again began a string of obsequious apologies, which ended when the words were graciously accepted. I complimented him on how effectively his camo had disguised him. For gosh sakes, I had been 15 feet from him, and couldn't see him! (I didn't tell him that I had just witnessed his naked butt, which he probably already knew. I also didn't tell him that he had a nice butt—as far as male butts go. But to tell him “you

have a nice ass, sir” may not have been perceived as a compliment, or at least, not the variety of compliment he wanted to hear from yours truly). Once the mutual embarrassment was over, he asked if I had seen any mule deer on this, the Day of the Butt. I truthfully told him that I had been on that hill three times a week for nearly a decade, and could count the mule deer observed during that time period on one hand. I went on to point toward my pal Dale DeNardo’s plot, and told him *that* was where all the mule deer could be found. (I often told the javelina hunters the same thing.) He didn’t buy it, and said his camp had already bagged two. As there were only three of them hunting together (two of whom were likely also dressed in full camo, and not to be seen), they had one more deer to drop to finish the hunt. That impressed me. These guys *had* to be good to bag even *one* mule deer in that area. I’m thinking that *maybe* wearing the camo helped? When he found out that I was radio tracking rattlesnakes, he wanted to come along. When I gave him an uneasy look, he promised me that he never shot them, because they tasted *nasty* (to which I agreed—they *do* taste nasty). He stayed with me for three of our *atrox*, which were all visible on the surface. He enjoyed seeing them, and we parted in friendly fashion. The epiphany of the value of camouflage in terms of invisibility to humans was not lost on me as we parted. Once I started wearing the stuff, there were several occasions when people shouted for me at the top of their lungs, wondering where the hell I was. I was usually ten feet or less away when that happened, and when I spoke up, they’d be amazed at how well the camo worked on the human eye. But not amazed enough to start wearing it!

So much for the human eye. Yes, it works! And big game hunters know the value of wearing full camouflage in order to be invisible to their quarry. But how does it work on herps? I personally don’t think it makes much difference with snakes. Gila Monsters (*Heloderma suspectum*) are another matter. I’m convinced that camo has allowed me to be invisible several times to them, especially those on the prowl. When I freeze in a shaded area, I’ve had them travel over 50 meters toward me, and continue right past me. A Gila on the hunt is an interesting sight to witness. When hunting dry washes, they move in V-patterns, a perennial, ponderous zigzag, constantly tasting the ground, pausing to dig a bit here, a bit there. Slowly but surely, they gain ground.

On one of my luckiest days in the field, I was slowly sauntering down a sandy wash that was approximately three meters wide. The wash was lined with knee-high berms to either side. The tops of these embankments were lined with all manner of Sonoran Desert plant life, from massive ironwood trees to hackberry to ragweed and limber bush. The soil slopes of the berms were pockmarked with hidey-holes of various shapes and sizes. I was looking for snakes, but was content with counting the Zebra-tailed Lizards (*Callisaurus draconoides*) that were kicked up out of the sand. The sun had just set, and the golden hour was upon the landscape. The lizard activity period was basically over. Those that were seen were buried in the sand, where my clumsy footwork forced them into rude and scurrying awakenings. My first sight of an American badger (*Taxidea taxus*) was of it crossing the wash, traveling from left to right. It was a hundred or so meters away when first observed. My first

impulse was to dig my camera out of its side pouch, but no! I was convinced that any motion at all would drive it off. So I froze, watched, and waited to see what would develop. The shadows were long at this time of the evening, and coming right at me. The place where I froze was already in deep shade. The patch of sandy wash in front of me was rather open, and without shade. It was a natural amphitheater of lighting for viewing anything that might be coming my way, which was precisely what that badger was doing. And without a naked, lily-white butt facing it, the camo allowed for invisibility. Joy of joys! It didn’t know I was there!

As earlier suggested, my first look at the badger was of it moving left to right. When it reached the berm of the wash bottom, it snuffled briefly into the dirt embankment with its upturned, pig-like snout, did an about face, and veered in angular fashion across the wash in the opposite direction. My immediate impression was that of a larger, faster, and more efficacious version of a Gila Monster on the hunt. It was a Gila Monster on steroids! That notion brought on a shiver of empathy for anything in its path. I already *knew* what a marauding badger could do to a rattlesnake or Gila Monster. This one was perhaps 60 cm long, perhaps 30 cm in width, and maybe 10 kg in mass. It rippled briskly from side to side of that wash, angling ever closer to me as it did. At times, it would snuffle into the sand of the wash, and raise its head in the air. The jowls opened and closed rapidly. Snarf-snarf-snarf—*something* went down the hatch. That happened several times as it continued to angle ever closer. It is my guess that it was snagging lizards out of the sand. While the careening advance in my direction was probably only a minute or so in duration, it seemed like an eternity—one that I didn’t want to end. So similar was its style of wash hunting to that of a Gila Monster that my brain went in the direction of badgers evolving from their lineage. The only difference was one of speed and precision. While by comparison, a hunting monster seems to blunder about in slow motion, that badger was moving at a brisk, efficient, and determined pace. Back and forth it went, getting closer with every sweep of that wash bottom. When it veered across my line of vision at a distance of less than four meters, every detail came into full focus: the rippling, unique motion, coupled with the majestic appearance of the long, silver-colored hair on the flanks, the bold white stripe that lined the face and continued down the length of the body, the pink, upturned snout, and those impossibly long claws. By this point, there were mini-depressions in the sand that had previously been occupied by Zebra-tailed Lizards. These were left by the lizards that had fled from me prior to the badger making its appearance. The badger sniffed each of these, but there was no digging. It seemed to know they were empty just by the information the extraordinary sense of smell delivered to the brain. One quick whiff of each while on the fly, and onward it went, with nary a backward glance. When it reached the left embankment, it once again did an about face, and angled ever closer to me. When it was about to pass me once more, at a distance of about a meter away, it suddenly stopped dead in its tracks. Its snout went high in the air, wiggled about a bit, the sound of vigorous inhaling became pronounced, and it came straight at me. Incredibly, I don’t believe that it had seen me. It was my take that it smelled me first! It then slowly advanced, until it was snuffling

my right hiking boot! Looking straight down on 20 pounds of silver-colored fur and solid muscle is a sight I will *never* forget. It also proved too much for me to endure. I leapt backward, my gullet ejaculating something like “GAA!”

“**SNORT**,” replied the surprised badger, which rapidly turned and waddled away from me at full throttle. I laughed a little as I saw it disappear far beyond the place I had first noticed it. The motion was akin to an undulating swath of a running rug, rippling across the sand until such point as it disappeared over the horizon. In short, the reader can feel free to continue to mock me for wearing camo all that they want. I am sold that camouflage works with people and wildlife alike, and will continue to wear it when outdoors, until I am no longer able to go outdoors.

A bit of foreshadowing to the brief history of Blake the Snake is in order. Because I can, I am including an image of a badger doing something else that badgers do. Once again, we compare the Gila Monster and the badger doing something that badgers do far better and faster. We speak of digging. With the Gila Monster, we speak of a creature that can thrive on three good meals a year. When monsters dig, they are usually going after something that is less than a meter deep, and they are excavating an existing hole just large enough to accommodate their relatively slender body girth. When we speak of badgers, we speak of an acute sense of smell that leads them to prey items that might be buried three or more meters deep. They are also digging to a width that must accommodate their bulky frames, and they must continue to dig if the prey item can escape by moving away from them. With badgers, we speak of long claws that send showers of earth behind them as they advance one body length per minute forward. They need to eat on a daily basis. When it comes to radio-telemetry studies on rattlesnakes or Gila Monsters, badgers especially, among many other top order predators, can be the perfect storm for both researchers and their subjects. A badger can, under certain circumstances, whittle a researcher’s N down considerably. With the Suizo Mountain Study, they did! As much as I love them, where herpetological radio-telemetry studies are concerned, I can say with all vehement sincerity “**Badgers? We don’t need no stinking badgers!**” (Figure 1).

Blake the Snake

The Suizo Mountain Study has been mentioned several times in these columns. What was only suggested once was how good our parking spot was in terms of finding very cool herps. The usual scenario was that we would arrive at this hallowed patch of ground with full bladders. The night about to be discussed was no different. One of the techniques that a canine uses to mark its territory is to consistently urinate in a particular spot. The scent often serves to drive other dogs away. It is unfortunate that human urine does not have the same repelling characteristics. If it did, we would have had the entire region to ourselves! Fifteen years of making our bladders gladder in that vicinity would have assured a complete paucity of human activity there!

On 27 August 2011, at 1930 hrs (7:30 P.M.), I pulled into our perennial piss-puddle, er uh, parking spot. Blake Thomason was with me. While Blake was a resident of California, he often

traveled to Arizona for business purposes. This allowed for him to join us on countless occasions. He is gifted at finding snakes, and his cash contributions and enthusiasm with Tiger Rattlesnakes (*Crotalus tigris*) lit a spark that inspired us to start radio-tracking them. Getting back to 27 August, Blake and I got out of my truck and headed in opposite directions to urinate. While both of us were in mid-stream, so to speak, Blake made the following utterance: “Amigo! I got an *atrox* here.”

“Yeah? Well, I got a python here. Stop bragging about yourself like that!”

“No amigo, I really mean it! There’s an *atrox* coiled on the ground here. I almost pissed right on it!”

In unhurried fashion, I finished up, zipped up, and casually sauntered over to Blake’s side. Sure enough, there was indeed a rattlesnake coiled on the ground near Blake’s puddle. But seeing it with clarity was a bit of problem. The darkness caused by a phenomenon commonly called “night” was the likely excuse for our advanced state of myopia. I doubled back to my truck—a distance of two steps—to get my flashlight. As soon as the beam centered on the snake, we both noted—with no small measure of excitement—that there was a case of mistaken identity involved here. The snake was *not* a Western Diamond-backed Rattlesnake (*Crotalus atrox*). Nope! It was a Mojave Rattlesnake (*Crotalus scutulatus*). At times in this column, we will call them “scut,” which is pronounced as “scoot.” Under the confounding and befuddling rules of the English language, proper grammar would dictate that an “e” be added after the “t” in “scut” in order to signify the long U pronunciation. But alas, the word “scute” usually defines a large scale on the shell of a turtle. The confusion of this confounded word “scute” causes more confusion with the word “scut!”

Blake’s Mojave Rattlesnake was only the second one found on the Suizo Mountain study plot. Since we started the study in 2001, and I had been going there since 1992, it is fair to say that they are rare there. It is also interesting to note that in both cases, the person who found it called it an *atrox*. The two species are indeed similar in appearance. But in most cases, scuts tend to be greener in coloration. The scut on the cover of this publication is a good example of the color scheme that they exhibit in south-central Pinal County, Arizona. Like *atrox*, scuts exhibit the black and white banded “coon tail,” which can also lead to mistaken identification. With scuts, the black banding encircling the tail tends to be narrower than the alternating white band. With *atrox*, the bands are usually equal in width. The head of a scut is also distinctly more of a wedge than that of *atrox*. But the sure fire way to tell the difference is to look directly down on the top of the head, and focus on the scales directly between the eyes. With *atrox*, the scales between the eyes are granular—looking much like sandpaper. With scuts, there are two (sometimes four) larger scales residing between the supra-ocular scales. Yegads! Can we go back to our scut on the ground now? Good! (See Figure 2.)

We bagged this scut, later named “Blake the Snake,” AKA “scut #1,” without incident. We were blessed with having enough transmitters that we could spare one for him. During processing, we learned he was a male, with a snout–vent length



Figure 2. Blake the Snake, scut #1, a Mojave Rattlesnake discussed in this article, as he appeared in situ on the evening of 27 August 2011. The righthand image was taken the following day, just prior to his surgery.

of 855 mm (~33.5 inches), a tail length of 70 mm (~2.76 inches) and a mass of 456 g (just over 1 pound). Its rattle was basal plus eight segments, the ninth segment was broken. As Figure 2 indicates, the rattle was slightly tapered. Taking all factors of the metrics into account, Blake the Snake was a healthy, prime-of-life scut. As soon as he was released, (post surgery), to the best of the knowledge of every long-term local herp expert to work in the vicinity of Tucson, the words that accompany this Suizo Mountain Study animal are the first words to ever appear in print on a local radio-telemetered study of *Crotalus scutulatus*. While it appears that other such studies happened, details are nonexistent. Who did it, and whether or not anything was ever published, is unknown. This author has emailed every local herpetologist to work with Dr. Chuck Lowe during the time period that it allegedly happened. They know *nothing* about it. Neither do two stalwarts from the Phoenix area. In that enigmatic path that nearly every important herp study in Arizona has followed—POOF—it is gone! My take is that all information on this study, literally and figuratively, went up in smoke when Dr. Lowe's house burned to the ground in a house fire. Meanwhile, as these words are written, another radio-telemetry study on scuts in Arizona is underway. That study is being conducted under the generalship of noted scut expert Mike Cardwell. There is no doubt in my mind that Mr. Cardwell will publish the results. Until that point in time, my words on scut #1, Blake the Snake, will be the only words from Arizona to ever be published on the subject matter of a radio-telemetered Mojave Rattlesnake. For the first 2 tracking sessions, which happened on 7 and 11 September 2011, scut #1 behaved exactly the way a male *atrox* would. He was visible with each visit, utilizing triangle-leafed bursage and prickly pear cactus. He was also staying very close to Iron Mine Hill, but not venturing upward to the slopes. In the manner that all subsequent tracking sessions revealed, there were small soil holes peppered about him. Said soil holes were likely those of pocket mice or kangaroo rats. My third visit to him occurred on 13 September. In what was a sneak preview of what was to follow, he had moved 366 meters in a west-by-northwest fashion—this in two days. He was viewed and subsequently photographed under bursage. His distended flanks revealed that he had scored a meal. *Nothing* brought more joy to

this herper than seeing a new subject snag a meal. Blake the Snake was off and running—with a heavy emphasis on “running.” So off and running was he that by the evening of 17 September, he was off our radar! This evening was also to be the one and only “rattlesnake roundup” to occur in the history of the study. Over 100 people were invited to attend. Six people showed up! It's a good thing that this author isn't a sensitive guy! But it's a bad thing that this author has spent half of his life helping others with *their* projects—only to be ignored in *his* time of need! Nevertheless, the six people who showed were powerhouses in the field. Their efforts will be honored in the acknowledgment section at the end of this column.

It is not often that scripture is quoted in herp literature. But in Luke 15:4, Jesus Christ is quoted as saying: “Suppose one of you has a hundred sheep, and loses one of them. Doesn't he leave the ninety-nine in the open country, and go after the lost sheep until he finds it?” On 17 September, Blake the Snake became one of those lost sheep. It is extremely frustrating to raise an antenna into the air, and hear only static as result. This happened all too often on our plot, and usually signified a dead transmitter. I never used “lost sheep” to describe such events, “lost child” were the words that were always inscribed on my data sheets. But the parallel with the parable in the gospel of Luke is obvious. Another term we used verbally among ourselves was “milk carton snake.” In days of yore, pictures of lost children were depicted on cartons of milk, along with the phrase “Have you seen this child?” On 17 September, when I went to the top of Iron Mine Hill to check the signals of our eight subjects, the signal for Blake the Snake was conspicuous in its absence. My mind hatched the plot to put his image on a milk carton, along with the bold question: “Have you seen this scut?” On this evening, I had arrived with a gang of three others one hour early. Despite the fact that there could have been over 100 people arriving at 1900 hours, the four of us followed the suggestion given in Luke 15:4. We also left our eight subjects in an open field as we did so. From 1830 to 1945 hours, we hit most of the back roads known to us seeking scut #1's signal. We finally got a faint signal, indicating that our lost child was continuing his run to the west. The three in my truck were extremely



Figure 3. Blake the Snake became a lost child for a period of two weeks in September. This image was taken on 28 September, when scut #1 was finally found again. It was a festive occasion for the author.

gung ho to track him down, and so was I! But the three people in my truck were highly-skilled field herpers, and to drag them away from our roundup mission would be defeating the purpose. When we arrived back at our parking spot, exactly one hour late, we saw three flashlights sweeping Iron Mine Hill. Those who arrived before we did decided to start without us! We joined them, and the seven of us scored mightily. Tracking Blake the Snake would have to wait.

My next effort to find our lost child was on 24 September. There was a moment of elation when, at precisely 0600 hours, I captured his signal from the top of Iron Mine Hill. The elation morphed to despair by 0730, when a long hike ended without success. The signal could not be found again this day. Dr. Wolfgang Wüster, of the University of Bangor, Wales, was to arrive with his herpetology class that evening, and some preparation was required. As a precursor to their appearance, I needed to track all the other herps under watch. This was done, with many mumbled curses under my breath throughout the process. I had just burned 1.5 hours of priceless morning time chasing my lost child, to no avail.

Finally, on 28 September, a very determined tracker got the signal from the top of Iron Mine Hill again. This time, there would be no quitting. I made dead certain exactly which direction the signal would lead me by using a compass, and at 1700 hours, started down the hill on foot. As soon as I was a short distance downslope, the signal winked out. I was now performing what we called “blind tracking,” which is heading in a straight line and hoping that at some point, the signal would be picked up again. At the point the signal died, a Sonoran Desert Tortoise (*Gopherus morafkai*) ambled across the path of my bushwhack. He carried the number 505 on his rear carapace. He is an adult male tortoise who was marked in March of 2005. He was, and continues to be, the most consistently found tortoise on Iron Mine Hill. On this late afternoon encounter, number 505 gave me a nod. I replied with a smiling nod, and continued onward down the slope. I soon plunged into Suizo Wash, veering left and right off my compass direction in order to avoid dense pockets of massive ironwood and palo verde trees, the trunks of which were encircled by impenetrable thickets of hackberry and two-meter tall ragweed. While thus immersed in the depths of the vegetation in Suizo Wash, the deep shadows



Figure 4. Blake the Snake on the move! At the point where this image was taken, on 2 October 2011, he had moved nearly 1.5 miles westward—in four days time!

caused a false form of the golden hour to surround me. My mood mellowed with the appearance of the day’s afterglow. Any previous frustrations morphed to ecstasy when, 45 minutes into the hike, the signal appeared on my receiver. The blips were leading me in the exact chosen compass-path direction. I was “on the trail again,” and suddenly, all was well with the world! Less than half an hour later, I stood above Blake the Snake. At 1812 hours, my data sheet had this to say: “Coiled in hunt posture, south canopy of Bursage, northwest canopy of 1 m tall by 2 m wide by 4 m long Prickly Pear (E-W). Some soil hole activity in Prickly Pear center. Just south of Huerfano Road, at water tank.” His health was listed as “great,” which was the second highest ranking we gave to health (Figure 3). In his 15-day absence, he had traveled 1,447 meters (~0.9 miles) in a west-by-northwest direction. He was now at his site number 5. He had traveled in a direction that no other telemetered Suizo Mountain herp had ever gone, and was found along a road that we had never used. Had I known where he was, I could have parked my truck less than two meters from him. Huerfano Road was utilized for all future tracking sessions, and we did not lose his signal again until the bitter end.

On 2 October, (four days later), John Slone and I got a very weak signal off Huerfano Road—well beyond site 5. The signal indicated he was well north of the five-strand barbwire fence that ran along the length of the road. We managed to somehow get over that spindly, crotch-grabbing fence with our private parts intact, and hoofed in a northwesterly direction. It was a lengthy hike, as he had traveled 2,388 meters (~1.48 miles) beyond his occupancy of site 5. At 2046 hours, he was found on the crawl, traveling in the same westerly direction that was leading us ever further away from Iron Mine Hill. I was able to get a few images of him crawling (Figure 4), after which he coiled and hissed prolifically. He also rattled briefly, and then settled down. The last entry on my data sheet ended with an all-too-common phrase, used with nearly every plot snake found on the crawl: “He is waiting for us to leave.”

After his *huge* four-day move, he began to settle down. He was seen at site 7 on 9 October, having moved a puny distance of 113 meters. The last time we saw him above ground was 9 October, at site 8. He remained underground here for at least a week, perhaps as long as two weeks. Following that, there was



Figure 5. An in situ image of Blake the Snake's site number 13—his overwintering location. Date that he was first noted at this location: 19 November 2011. Date of photo is 10 December 2011. Note that Huerfano (The Orphan) Peak is directly south of this site, and compare to Figure 7.

no move greater than 64 meters. He began to travel in a circular fashion, as snakes ready to settle in often do. He utilized small, soil holes to go underground each time, until (as superstitious luck would have it) he entered site 13 on 19 November. We once again resort to my data sheet for the description: "Not visible, has utilized ~40 mm diameter soil hole, ~600 mm south of ~1 meter tall chain fruit cholla. Bursage and dead cholla (CF), 1 pincushion cactus, and 4 more soil holes nearby." (See Figure 5.) It was here that Blake the Snake chose to overwinter. From site to site, point to point, he had traveled a *staggering* straight line distance of 4,976 meters (3.1 miles) in less than a three-month time period! And we must keep in mind that point-to-point distances are straight line distances only. Any weaving on the part of scut #1, which surely occurred, is not, and can not, be included.

Meanwhile, the number 13 keeps coming at us! We visited scut #1 a total of 13 times after he entered site 13! But we get ahead of ourselves by making such statements. Our third visit was on 4 December. We saw him on this day, but we cheated a bit to do so. Gordon Schuett had recently purchased a bore scope, which we immediately dubbed "Gordie's anal probe." Through the miracle of fiber-optics, we were now able to see up

to one meter deep (more than that, if the animal underground was directly in front of the lens without obstructions). On this day, we slipped the probe into the soil hole described above. We saw Blake the Snake, still alive and looking good, at a depth of 60 cm. That was the last time that we ever saw him alive. On 4 February 2012, this ever alert and badger-wary scribe noted that the site entrance hole demonstrated some disturbance. Said disturbance was the *exact* shape that indicated a mammalian predator had recently thrust its snout into the hole. On 12 February, 2012, John Slone and I saw the distinctive sign that a badger had come calling. There was no guesswork involved with the identification, as the 320 mm wide by 740 mm deep hole was badger shaped. But ignoring even that, the dirt that had been excavated alongside of the gaping hole was pockmarked with badger tracks. The long claw marks and unique pad-shape of each impression left behind demonstrated the obvious. That is the kind of smoking gun that can't be ignored, or dismissed as speculation. However, the pinpoint accuracy of the signal indicated that Blake the Snake was one meter beyond the depth of where the badger hole ended. Trusting the signal as I do, it remains my impression that the badger had tried to get him, but failed. Six days later, the situation remained the same. The signal demonstrated that Blake the Snake was still out of harm's way. In an attempt to be sure, I groped about the loose soil at the bottom of the badger hole with both hands. This effort to find a transmitter failed.

Thanks to the most dreaded of all hunts in Arizona, I did not return to site 13 until 3 March—13 days later. The hunt we speak of is the spring javelina hunt. It is the last chance of hunters to make edible kills, and they show up in droves to perform their last hurrah. The normally quiet and pristine surroundings of the Suizo Mountain plot becomes an area of tent cities, roaring quads, and illegal wildcat shooting. ("Wildcat shooting" is a phrase for target shooting in areas not designated for such activities. They aren't shooting wildcats, but rather, target shooting—which is illegal on State Trust Lands. But certainly, any wildcat unfortunate enough to show even one whisker on its face would be blown to smithereens. *That* would be perfectly legal!) For whatever reason, it was not until 3 March that it was correctly ascertained that Blake the Snake was

dead. Count on it—dead! On this day, the signal led me directly to the transmitter, which was buried under perhaps 1 cm of soil near the front of the badger dig (Figure 6). The badger had returned at some point during my 13-day absence, and had dug in the direction of the known soil hole where scut #1 had been last observed. The deadly game of badger dodgeball was over for Blake the Snake. And the first-ever documented radio-telemetry study of a Mojave Rattlesnake (*Crotalus scutulatus*) in Arizona came to an abrupt end.

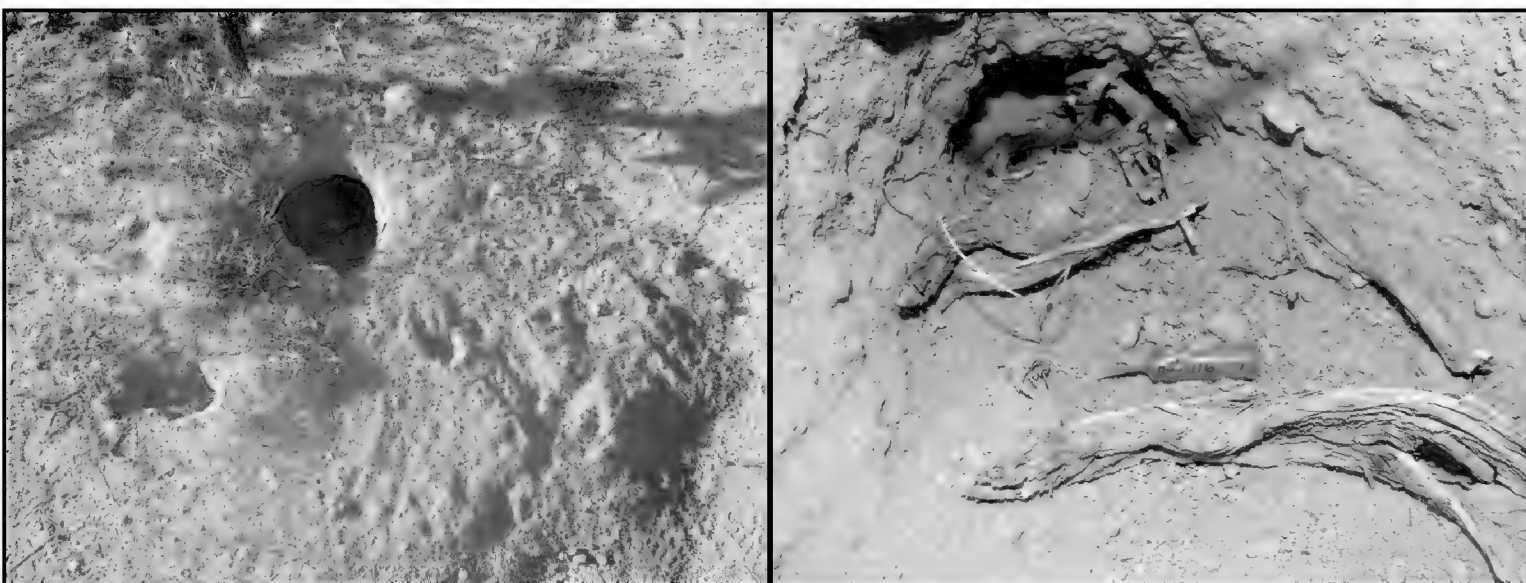


Figure 6. Left: On 12 February, 2012, the author and field technician John Slone observed this at site 13. The shape of the hole, and the impressions left in the soil to the right of the hole, strongly indicate that this hole was dug by a badger. Based on the fact that the strongest signal was emanating from a meter beyond the end of the badger hole, both Mr. Slone and this author felt that the snake was still alive and out of harm's way. **Right:** This image, taken 3 March 2012, indicates that Blake the Snake is dead. Count on it! The Holohil 9-gram transmitter in the image was all that was left of him.

Epilogue

There would be those who might say that scut # 1 was simply running from us during the all-too-brief six-month period that he was under observation. This author would never be so arrogant as to *insist* that this scenario isn't possible. However, the breadth of knowledge I have on the area offers a different situation. Over the total 15-year period of the Suizo Mountain study, only three scuts were found. All were prime-of-life males, much like Blake the Snake. It is no secret that male rattlesnakes of many species often make massive moves during the mating season. They are likely seeking mates, but also they may very well be seeking new territory to occupy. My experience with the main road that initially led me to Iron Mine Hill goes back to 1988. We speak of hundreds, if not thousands, of trips up and down this road. *Never* did I see a Mojave Rattlesnake any closer than one mile west of our plot. While absence of evidence is not necessarily evidence of absence, the sheer magnitude of effort put into this area points minimally to "they just ain't there!" While the almighty N of three shows that they *can be found there*, that same puny N also indicates that they are *not* commonly encountered there.

No, my speculation of what happened here with Blake the Snake is as follows: He was a prime-of-life male, who set off on a great and incredible journey. That he was likely seeking a female is highlighted by the fact that he was first found on 27 August, at the beginning of mating season for scuts. Sadly, his odyssey did not lead him to a receptive female. But he did get screwed at the end. While his first few movements indicated that he *might* be a resident of the area, later events proved otherwise. The place where he over-wintered was definitely well inside the easternmost limit of where scuts are known to commonly occur. Simply put, first he found us, and later a badger found him.

This here is Roger Repp, signing off from a *ridiculously* hot

and dry southern Arizona, where I ask myself: "How can *anything* survive this?" The land "where the turtles are strong, the snakes are handsome, and the lizards are all above average" is now in serious peril.

Acknowledgments

First and foremost, the author wishes to express his heartfelt gratitude to Dr. Gordon W. Schuett. Against his wishes, he performed the surgery on Blake the Snake, which is but a small example of his willingness to work with me during the latter days of the Suizo Mountain study. Also, his devotion to both me and the study allowed my personal evolution into something bigger than I was, or ever would have been.

Secondly, as suggested in the text above, I respectfully acknowledge the efforts, in alphabetical order, of Paul and Steven Condon, Hans-Werner Herrmann, Brian Parks, John Slone, and Blake Thomason for their participation in the one and only roundup in the 15-year Suizo Mountain Study. They were *truly* an A-team on this night, the results of which are worthy of a column. As that may never happen, a male Tiger Rattlesnake (named Steven) and two Black-tailed Rattlesnakes (Susan and Gus), were encountered, captured, and surgically implanted with transmitters. These three snakes led us down the path of history-making observations. (The reader is asked to recall, or perhaps even review, *An Ode to Gus* which appeared in the July 2016 issue of this publication, and *Steven and Ellie*, in the July 2017 issue.)

Lastly, the biggest ack of all goes not to people, but rather, the herps of the Suizo Mountain study. They witlessly gave their all for their human counterparts, who fumble to answer endless questions about the how and why of all things associated with the natural history aspects of herpetology.



Figure 7. This image shows the approximate extent of Blake the Snake's movements from 27 August 2011 to 19 November 2011. Note that Huerfano Peak is well to the south of the X, and compare this with Figure 5. During his 2.5 months of activity, taking the location of each tracking session on a straight line, point to point basis, he traveled over 3.1 miles! The image shows the 2.8-mile overall west-by-northwest movement that resulted. The truck to the left of the image was where he started, and the vicinity directly below the X is where he finished. To think that this distance was covered by an animal that crawls on its belly is staggering!

What You Missed at the August Meeting: Sara Ruane

John Archer
j-archer@sbcglobal.net

Dr. Sara Ruane is having a lot of fun and invites everyone to join her. At least that's my impression. At an early age she became entranced with herps, particularly snakes. With direction and determination she is now assistant professor at Rutgers University–Newark. We were lucky to have her as our August speaker. From our website:

Sara began her career in herpetology by going for walks in the woods with her grandmother in northeastern Pennsylvania, with her grandmother always encouraging her to flip over rocks and logs to see what was under them; this quickly turned into a passion for finding herps, especially snakes! Sara did her undergrad work at UMass Amherst, an MS at the University of Central Arkansas where she focused on turtle ecology, and a PhD at City University of New York with a focus on snake systematics. Her work on disentangling and revising milksnake taxonomy during her dissertation was followed by a post-doctoral position at the American Museum of Natural History studying snakes of Madagascar and then a second postdoc at LSU's Museum of Natural Science. At LSU, Sara pioneered a method that allowed for extracting and sequencing DNA from old preserved museum specimens, which had previously proven challenging. In 2017, Sara started her current position at Rutgers University Newark, where she is an assistant professor in the department of biological sciences.

If you google her name you'll find evidence to support my impression. She has a website, is active on Twitter, is very active in outreach of all types, has authored many papers, and is involved in lots of field and lab research. If you were lucky enough to have dinner with us after the meeting, you would have been enthralled by her tales and impressed with her intelligence. Her presentation reflected her personality. She titled it "Global Snake Diversity: Describing It, Understanding It, and Loving It!"

Sara's main interest is systematics, which she defines as the qualifying and quantifying of earth's biodiversity. It's a subject



Sara Ruane salvages a road-killed specimen while en route to a wedding.

that allows her to do field work, lab work, museum work, and collaborate with people in many other fields. "Anybody who's got an interest and a passion for this kind of stuff ends up being a collaborator." She wants to conduct studies that not only inform herpetology but the broader field of evolutionary biology. One of the main tools used for her studies is DNA, and she gave us a short synopsis of how DNA can help identify species and relationships between species. She mentioned the global snake diversity and how it's amazing that a "tube within a tube" can fill so many

different niches. Snakes inhabit all but the coldest places on earth with around 3700 species described, 39 just in 2018. This diversity encouraged her to pursue some specific areas of research.

Arboreal snake diversity is vast. Arboreal snakes have many different colors and patterns, many different diets, may be active either at night or during the day, and may either lay eggs or give birth to live young. Convergence in traits can be found in widely disparate groups. Sara and her cohorts set out to determine what it takes to live in trees. She wanted to explore the distribution of arboreal snakes through families and zoogeographic regions, if arboreality might influence diversification rate or body size, and if there are consistent traits within arboreal snakes. She and her grad students dove into the published literature to answer most of these questions.

Arboreal snakes are not distributed evenly across families. Some species-rich families like the Natricidae with 230 species have no arboreal snakes. Thirty-eight percent of the Colubrinae, 16% of the Dipsadidae, and 26% of the Viperidae are arboreal; 80% of the arboreal snake species come from those three clades.

Ruane Lab at Rutgers-Newark

Special focus on describing global snake diversity!

Arboreal Snakes

A "typical" arboreal snake

Banded/Blotched

Brown/Black

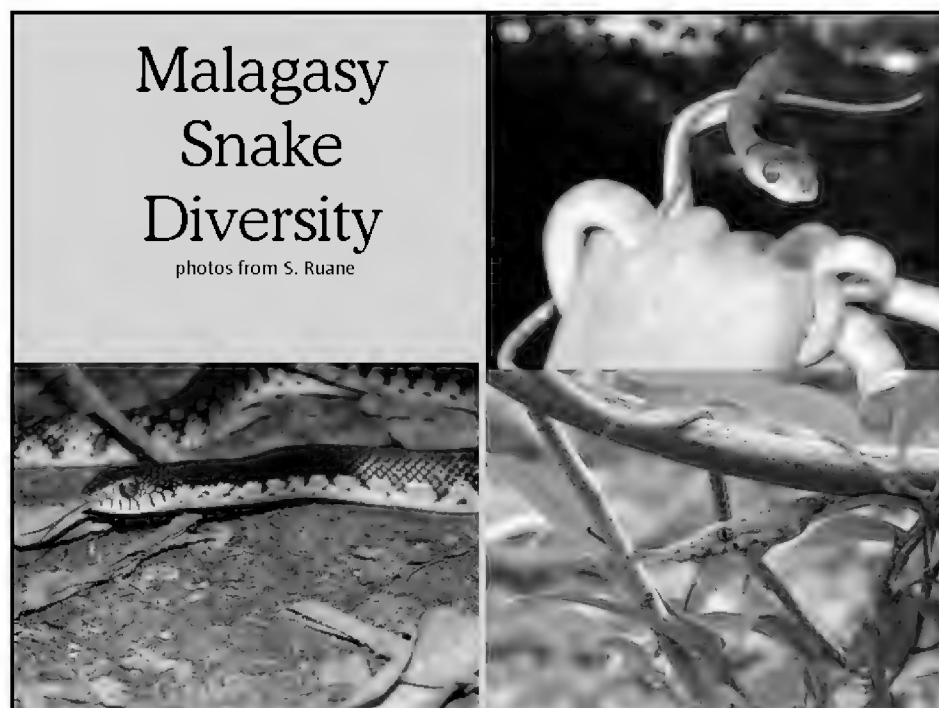
Eats ectotherms

e.g., *Imantodes cenchoa*
Belize, 2018

Oviparous

Nocturnal

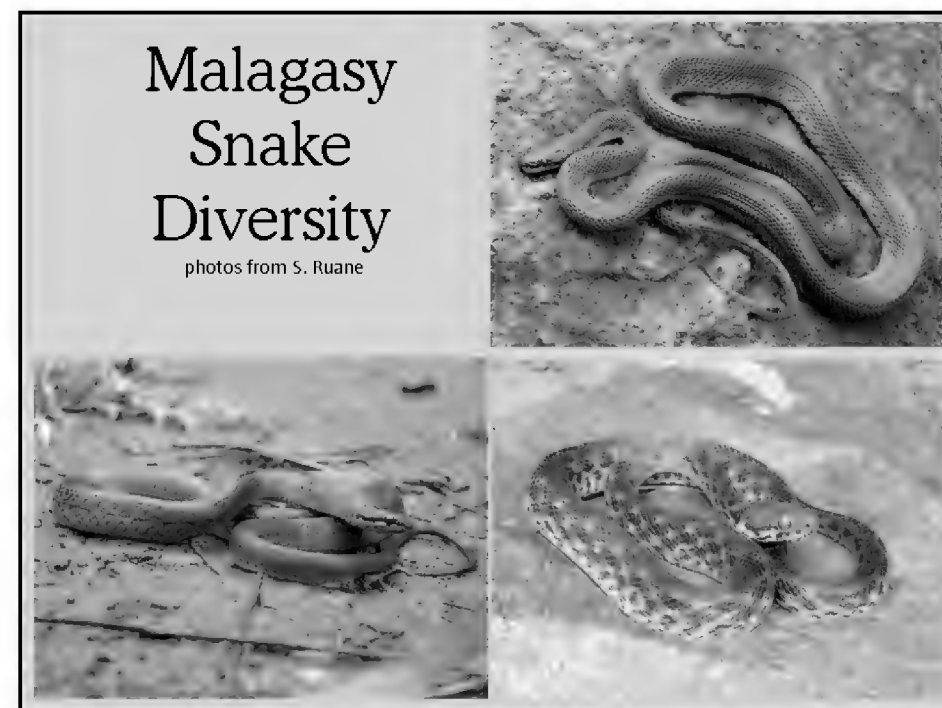
Neotropics



Some species-poor groups such as Boinae and Pareatidae are very arboreal. Geographic distribution of arboreal snakes is mostly Neotropical, with North America being particularly devoid. A “typical” arboreal snake will be banded or blotched, brown or black, oviparous, nocturnal, Neotropical, and will eat ectotherms (lizards, frogs and mollusks, mostly.) *Imantodes* is the archetype. Searching through the data revealed that being arboreal has no effect on diversification but does lead to a longer body length.

“Madagascar is probably my favorite place I’ve ever been to. Snakes there are spectacular,” Sara says. Morphologically and ecologically Malagasy snakes are incredibly diverse. From tiny fossorial snakes to heavy-bodied arboreal rain forest snakes, Malagasy has snakes that resemble and fill the same niches as nearly every species in the rest of the world, but unlike the rest of the world, 90% of Malagasy snakes evolved from a single subfamily. She clicked through several very cool photos of Malagasy snakes to demonstrate. Sara wanted to find what drives the diversity among Malagasy snakes. First one needs a decent phylogeny, so Sara spent about three years of her life developing one. She then looked at diversification rates on the island. Madagascar is about the size of California with very defined and diverse habitats, but Sara could find no evidence that habitat influences diversification rates nor could she relate such rates to particular physiological traits.

Sara next talked about the importance of museum collec-

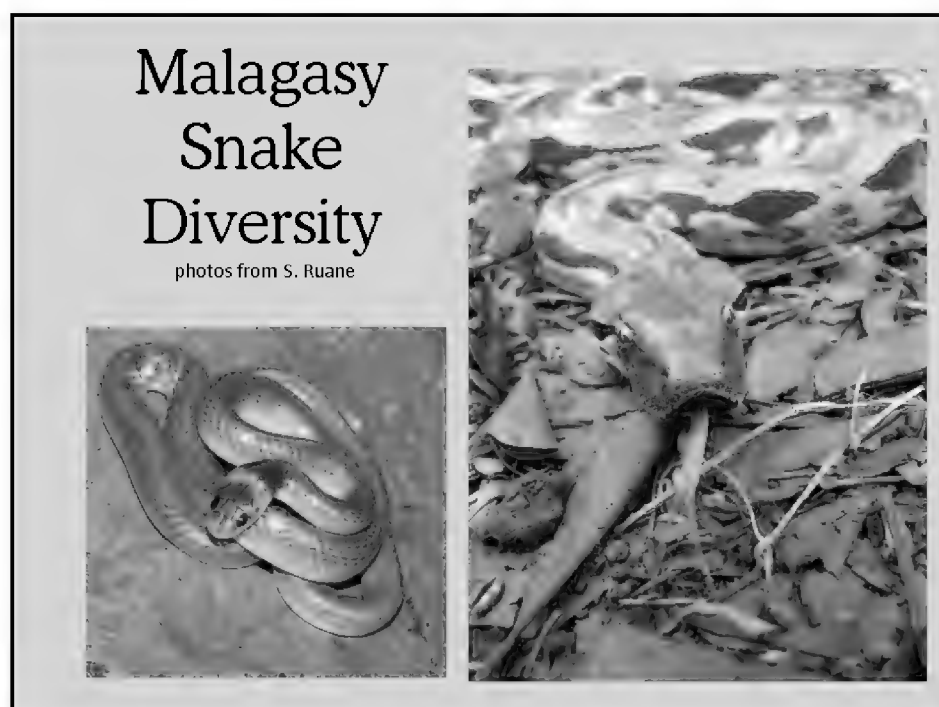


tions. After stating that she and probably most biologists did not enjoy collecting, she explained the need. Documenting biodiversity and studying diet, morphology, and distribution require having the animal, and all too often animals in the wild are not available for study. Tissue samples may not exist, collecting may be prohibited, animals may have gone extinct, and most animals can’t be easily found in the wild. Preserving an animal allows the science to advance in directions which may not have even been anticipated when the animal was collected. Sara developed and improved a method for extracting DNA from preserved specimens that allowed phylogenies to be determined of animals that previously had only confusing morphological data. We don’t know what we don’t know, and museum collections provide us data points in time that we may take advantage of in the future.

Sara finished with a primer on the importance of snakes, hoping to give us a bit more ammunition when confronting the majority who think all snakes should be eliminated. She clicked through a clever series of slides showing the results of declining snakes leading to increasing rodents allowing more ticks causing more Lyme disease cases. She also focused on the many medications developed from venoms, and then stressed the importance that even unpopular animals contribute to a healthy ecosystem.

Perhaps Sara’s personality was most on display when asked by one of the audience how to pursue a career in herpetology. She gave practical advice from her experience, adapted to the paths available now (Google). She laid out the importance of finding internships and how to make connections. Though she didn’t stress the hard work that she obviously put into her career, she laid out most of her career path in an accessible manner that was the closest to a road map I’ve seen. With hard work and a little luck, one could have the kind of career that Sara has.

Dinner after the meeting was a delight. We covered lots of topics and had a good time. I’m sure Sara has occasional attacks of low spirits, but I suspect that she has fewer than most of us. She’s too busy enjoying life and chasing snakes.



Herpetology 2019

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

TURTLE TRADE THROUGH FACEBOOK IN VIETNAM

Thong, P. V. et al. [2019, The Herpetological Journal 29(1): 48-56] report that trade of turtles, for both food and pet, represents a substantial business in Vietnam, especially because this country is a cross-bridge for wildlife trade from Indochina to China. Vietnam is also one of the main countries worldwide in terms of the number of Facebook members, and a considerable portion of the business has gone online through Facebook trading, including turtle trade. The advertisements of turtles for sale in Vietnamese Facebook groups were monitored for the period 2013–2018, obtaining a total of 481 advertisement cases concerning 5,758 individuals belonging to 53 species and 12 families. There has been a rapidly rising trade of turtles online, especially in the last two years. Many traded species were allochthonous, but native species accounted for 22 species and over 36% of the traded individuals. Most allochthonous species were traded as hatchlings and juveniles, whereas most of the native species were traded as subadults and adults, thus suggesting a high frequency of illegal trade in wild-caught animals. Five traded native species are considered among the 50 most threatened turtle species in the world. Turtle trade occurred mostly in the two biggest cities of Vietnam (Ho Chi Minh City and Hanoi), which accounted for 68% of the total trade. Turtle price varied substantially across species and by different lifestages (i.e., hatchlings, juveniles, sub-adults and adults), and increased considerably in comparison to 1993 estimates.

HATCH TIMING IN SNAPPING TURTLES

C. J. Rouleau et al. [2019, Journal of Herpetology 53(2):165-169] note that many oviparous species rely on hatching cues to ensure hatchlings maximize their survival, given the external environmental conditions. In nature, these cues are traditionally environmental (e.g., temperature) or social (e.g., communication between embryos). Examples of both are common throughout ectothermic taxa, particularly reptiles. This study explored the role of temperature in hatch timing in snapping turtles (*Chelydra serpentina*). The authors allowed embryos to incubate in wild nests for the majority of embryonic development, then isolated embryos in the lab, and maintained them at 24 °C until they reached Yntema stage 25. At this developmental stage, external morphological differentiation is complete and yolk resorption begins. They then incubated embryos until pipping across a range of constant but biologically relevant temperatures (20, 23, 25, 28, or 30.5 °C). To test whether thermal variance acts as a hatching cue, they also included a treatment in which temperature fluctuated diurnally around a stationary mean (25 ± 4 °C). It was found that the timing of egg pipping was not related to temperature treatment, thermal fluctuation, or sex of the embryo. Thus, contrary to traditional understanding, temperatures in the range studied do not affect the duration of the final embryonic stage in *C. serpentina* embryos, and a definitive hatching cue in this species is yet unknown.

Minutes of the CHS Board Meeting, August 16, 2019

Rich Crowley called the meeting to order at 7:50 P.M. Board members Dan Bavirsha, Cindy Steinle, Sammy Velazquez and Jessica Wadleigh were absent. Minutes of the July 19 board meeting were read and accepted.

Officers' Reports

Treasurer: John Archer presented the financial report for the month of July.

Media Secretary: Kim Klisiak is continuing to work on a new web site design. She requested input on content, and provided a means for those board members with an interest to toggle back and forth between the old and new sites.

Membership Secretary: Mike Dloogatch read the list of expiring memberships (only five this month).

Sergeant-at-arms: Mike Scott reported 38 people in attendance at the July general meeting.

Committee Reports

Shows: Gail Oomens quickly read through the list of upcoming shows. She requested help for September 7 due to a number of

simultaneous events that day.

ReptileFest: Frank Sladek will attempt to schedule next year's 'Fest for the weekend of April 4–5.

Junior Herpers: Frank Sladek reported 25 people at the August 4 meeting, at which Lalainya Goldsberry spoke about box turtles. Some of the older members (teens) feel some meetings are too elementary. Frank is considering a pre-meeting for them and maybe asking them to help run the actual meeting. The September meeting will be a field trip—location still uncertain. The speaker in October will be Alex Boersma, a conservationist and artist.

Nominating Committee: Jenny Hanson reported that the committee is still working to fill the slate.

Old Business

Rich Crowley is still collecting information for a CHS 50-year history.

The meeting adjourned at 9:56 P.M.

Respectfully submitted by recording secretary Gail Oomens

Advertisements

For sale: **highest quality frozen rodents.** I have been raising rodents for over 30 years and can supply you with the highest quality mice available in the U.S. These are always exceptionally clean and healthy with no urine odor or mixed in bedding. I feed these to my own reptile collection exclusively and so make sure they are the best available. All rodents are produced from my personal breeding colony and are fed exceptional high protein, low fat rodent diets; no dog food is ever used. Additionally, all mice are flash frozen and are separate in the bag, not frozen together. I also have ultra low shipping prices to most areas of the U.S. and can beat others shipping prices considerably. I specialize in the smaller mice sizes and currently have the following four sizes available: Small pink mice (1 day old—1 gm) , \$25 /100; Large pink mice (4 to 5 days old—2 to 3 gm), \$27.50 /100; Small fuzzy mice (7 to 8 days old—5 to 6 gm), \$30/100; Large fuzzy mice / hoppers (10 to 12 days old—8 to 10 gm), \$35/100 Contact Kelly Haller at 785-224-7291 or by e-mail at kelhal56@hotmail.com

Herp tours: **Costa Rica herping adventures.** Join a small group of fellow herpers for 7 herp-filled days. We find all types of herps, mammals, birds and insects, but our target is snakes. We average 52 per trip, and this is our 10th year doing it. If you would like to enjoy finding herps in the wild and sleep in a bed at night with air-conditioning, hot water and only unpack your suitcase once, instead of daily, then this is the place to do it. Go to our web-site <<http://hiss-n-things.com>> and read the highlights of our trips. Read the statistics of each trip and visit the link showing photos of the 40 different species we have found along the way. E-mail at jim.kavney@gmail.com or call Jim Kavney, 305-664-2881.

Line ads in this publication are run free for CHS members — \$2 per line for nonmembers. Any ad may be refused at the discretion of the Editor. Submit ads to mdloogatch@chicagoherp.org.

NEW CHS MEMBERS THIS MONTH

Abigail Arnashus
Caleb Bohus
Alexander W. Brand
Matthew Dearing
Allison Kennedy
Elizabeth, Rick, Dylan & Kat Riddle
Sara Ruane
Betsy Shepherd
Elijah W. Snyder
Alyssa Thunder

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UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, September 25, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. **AE (Ann-Elizabeth) Nash**, a doctoral student at the University of Northern Colorado, will speak about her research in Palo Verde National Park, Costa Rica, studying social behavior in the spiny-tailed iguana, *Ctenosaura similis*.

A speaker has not been confirmed for the October 30 meeting in time to be listed here.

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago's newest museum—the **Peggy Notebaert Nature Museum**. This beautiful building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? The next board meeting, will take place at 7:30 P.M., October 18, 2019, at Papa Passero's Pizzeria, 6326 S. Cass Ave., Westmont. If you think you might like to attend, please email rcrowley@chicagoherp.org.

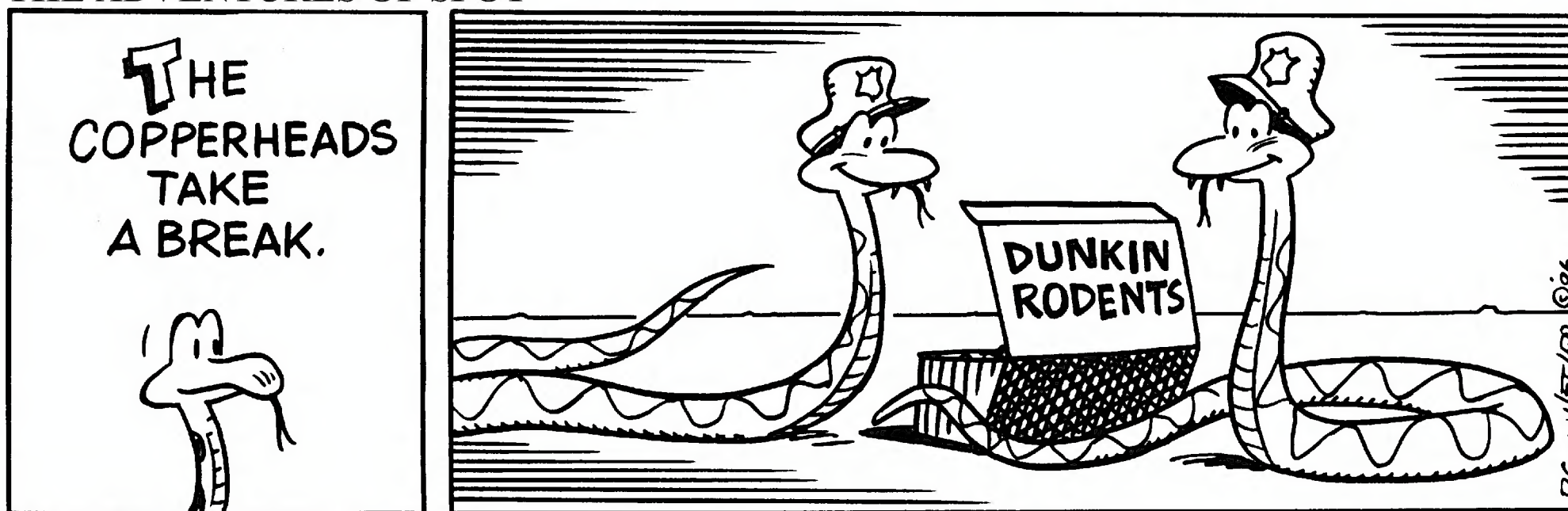
The Chicago Turtle Club

The monthly meetings of the Chicago Turtle Club are informal; questions, children and animals are welcome. Meetings normally take place at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Parking is free. For more info visit the group's Facebook page.

ELECTION FAST APPROACHING

The annual election of officers and members-at-large of the Chicago Herpetological Society board of directors will take place at the November 27 general meeting. The nominating committee will prepare a slate, but many qualified candidates will inevitably be overlooked. Additional nominations will be accepted from the floor at the September 25 and October 30 general meetings. If you know of a CHS member (yourself included) who might be willing and able to attend the monthly board meetings and serve in any of the positions listed on the inside front cover of this publication, consider placing that person's name in nomination.

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